



Systems Engineering Technical Leadership Development Program

Final Technical Report SERC-2012-TR-013-3

August 30, 2012

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Report Documentation Page		Form Approved OMB No. 0704-0188
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.		
1. REPORT DATE 30 AUG 2012	2. REPORT TYPE	3. DATES COVERED 00-00-2012 to 00-00-2012
4. TITLE AND SUBTITLE Systems Engineering Technical Leadership Development Program		5a. CONTRACT NUMBER
		5b. GRANT NUMBER
		5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER	
	5e. TASK NUMBER	
	5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Stevens Institute of Technology, Systems Engineering Research Center, Castle Point on the Hudson, Hoboken, NJ, 07030		8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited		
13. SUPPLEMENTARY NOTES		

14. ABSTRACT

In 2009, the Defense Acquisition University (DAU) contracted with the Systems Engineering Research Center (SERC) to develop an extension of the DAU Systems Programming, Research, Development, and Engineering (SPRDE) program that specifically focuses on technical leadership. This Technical Leadership Program (TLP) specifically will provide leadership insights into systems engineering (SE) activities and issues at the system, business, and enterprise levels. In the first year of the project (the Year 1), the team developed a competency model for systems engineering technical leadership, a high-level architecture for approaching technical leadership in the classroom, and an allocation of competencies within this architecture. In the first half of the third year (Year 3), the team has conducted one additional SYS 350A Systems lens pilot, developed SYS 350B Business lens course materials, conducted two SYS 350B Business lens pilots, and has designed a recommended SYS 350C Enterprise curricula and accompanying segment storyboards describing the objectives and proposed delivery of 350C lectures, case studies, student exercises, and the course group project for DAU review. The systems and business lenses contain focus areas which reflect the key learning areas believed critical in the context of defense acquisition. The enterprise lens content is focused around a holistic mapping for enterprise change. For the systems and business lenses ? additional architectural detail has been developed including specific learning modules for each focus area, including lectures, case studies, leadership threads focusing on non-technical skills, and groupbased project work. For the enterprise lens, the RT-4 team is in the process of developing detailed materials, though a curriculum framework, syllabus, and outlines have been developed. The primary materials for the SYS 350A system lens were developed in Year 2; two pilots for the systems lens were developed in Year 2. A third pilot for the systems lens was delivered at Redstone Arsenal in Huntsville, AL in April 2012. The SYS 350B business lens materials were piloted with DAU instructors in May 2012 and with students in June 2012. Student feedback was collected after each pilot. The team is currently drafting materials for the 1-5 October 2012 SYS 350C Enterprise Lens pilot , which will be structured as an instructor pilot and will be delivered at DAU. A second SYS 350C pilot with students will be delivered in November, 2012. This report discussed the work completed to date in Year 3.

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:

a. REPORT
unclassified

b. ABSTRACT
unclassified

c. THIS PAGE
unclassified

17. LIMITATION OF ABSTRACT

Same as Report (SAR)

18. NUMBER OF PAGES

113

19a. NAME OF RESPONSIBLE PERSON

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This material is based upon work supported, in whole or in part, by the U.S. Department of Defense through the Systems Engineering Research Center (SERC) under Contract H98230-08-D-0171. SERC is a federally funded University Affiliated Research Center managed by Stevens Institute of Technology

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ABSTRACT

In 2009, the Defense Acquisition University (DAU) contracted with the Systems Engineering Research Center (SERC) to develop an extension of the DAU Systems, Programming, Research, Development, and Engineering (SPRDE) program that specifically focuses on technical leadership. This Technical Leadership Program (TLP) specifically will provide leadership insights into systems engineering (SE) activities and issues at the system, business, and enterprise levels. In the first year of the project (the Year 1), the team developed a competency model for systems engineering technical leadership, a high-level architecture for approaching technical leadership in the classroom, and an allocation of competencies within this architecture.

In the first half of the third year (Year 3), the team has conducted one additional SYS 350A Systems lens pilot, developed SYS 350B Business lens course materials, conducted two SYS 350B Business lens pilots, and has designed a recommended SYS 350C Enterprise curricula and accompanying segment storyboards describing the objectives and proposed delivery of 350C lectures, case studies, student exercises, and the course group project for DAU review. The systems and business lenses contain focus areas, which reflect the key learning areas believed critical in the context of defense acquisition. The enterprise lens content is focused around a holistic mapping for enterprise change. For the systems and business lenses – additional architectural detail has been developed including specific learning modules for each focus area, including lectures, case studies, leadership threads focusing on non-technical skills, and group-based project work. For the enterprise lens, the RT-4 team is in the process of developing detailed materials, though a curriculum framework, syllabus, and outlines have been developed.

The primary materials for the SYS 350A system lens were developed in Year 2; two pilots for the systems lens were developed in Year 2. A third pilot for the systems lens was delivered at Redstone Arsenal in Huntsville, AL in April 2012. The SYS 350B business lens materials were piloted with DAU instructors in May 2012 and with students in June 2012. Student feedback was collected after each pilot.

The team is currently drafting materials for the 1-5 October 2012 SYS 350C Enterprise Lens pilot, which will be structured as an instructor pilot and will be delivered at DAU. A second SYS 350C pilot with students will be delivered in November, 2012.

This report discussed the work completed to date in Year 3.

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Contract Number: H98230-08-D-0171

Report No. SERC-2012-TR-034-1
August 30, 2012

WHS TOO009 RT0004

UNCLASSIFIED

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1 EXECUTIVE SUMMARY

2 BACKGROUND

The Department of Defense (DoD), along with most government agencies, is under tremendous pressure to increase the success rate of its acquisitions programs by¹:

- Better equipping/supporting/enabling the workforce to perform successfully and meet all demands,
- Mitigate loss of skilled/experienced workforce,
- Successfully compete for, hire and retain talent,
- Transfer knowledge / expertise to new generation,
- Integrate acquisition workforce planning with DoD Total Force Human Capital Planning, and
- Strategically plan and resource human capital initiatives.

The DoD has tremendous challenges in sustaining and growing its science, technology, engineering, and mathematics (STEM) workforces in support of acquisition excellence. In 2006 the DoD released its Civilian Human Capital Strategic Plan² with the goal of developing, “a civilian workforce that possesses the leadership, competencies, and commitment necessary for successful mission accomplishment.” Thus, under this backdrop, research is being conducted to develop the competencies necessary for the technical leadership workforce.

Developing a concise and universally-accepted definition of leadership for people involved in technical engineering management is difficult. For example, Rost (1991) analyzed 221 definitions of leadership in an effort to develop a meaningful definition. Most definitions share several common features—leadership is an interpersonal influence process that is goal-directed and purposeful. Leadership is defined as “the process of influencing an organized group toward accomplishing its goals” (Farr, et al, 1997). For this project, technical leadership is defined as motivating and guiding a group of technical professionals to define and deliver constructive change producing new technical performance or systems. To develop a senior technical leader requires many years of experience leading to the completion of many complex projects encompassing multiple jobs involving many programs. Within the DoD, long program life cycles, competition for scarce human capital, acquisition reform, and the scale of projects within the defense community has led to a dearth of senior technical leaders

¹ Taken from a briefing by Gordon Kranz, DUSD(A&T)/SSE Director, Technical Management Functional Leader, “Human Capital Strategy and Planning for SPRDE-SE & PSE, DT&E, and PQM,” <https://acc.dau.mil/GetAttachment.aspx?id=280166>, August 28, 2009

² This report can be accessed at http://prhome.defense.gov/docs/civilianstrat_plan7_9.pdf

with sound SE³ and technical project leadership skills. As a result, it has become more important than ever to develop more capable senior technical leaders with not only sound engineering skills but also the ability to think and act holistically. Technical leaders must be systems thinkers, understand systems-of-systems (SoS) and enterprise issues in addition to traditional tenets of leadership and management. Research is needed to synthesize and validate curriculum content and structure for a program to develop future DoD senior technical leaders.

In support of educating the DoD acquisition workforce, the DAU provides practitioner training, career management, and services to support the majority of the acquisition, technology, and logistics (AT&L) community. Currently the Systems Planning, Research Development, and Engineering (SPRDE) career field is the largest⁴. Within the SPRDE career field, the DAU currently offers Level I, II, and III certifications in Program Systems Engineering (PSE), Science and Technology Management (S&TM), and Systems Engineering (SE) career paths. For this effort, the focus is on the SPRDE-PSE and SPRDE-SE career fields specifically.

This research topic will support and extend the SPRDE-PSE and SPRDE-SE certificates offered by the DAU at Level III. This research is needed to develop, synthesize and validate curriculum content, course materials, and structure for a program to develop future DoD senior and executive SE and technical leaders.

2.1 REVIEW OF PREVIOUS WORK

In 2009, the Defense Acquisition University (DAU) contracted with the Systems engineering Research Center (SERC) to develop a curriculum for technical leadership. The purpose of this work was to thoroughly research the state-of-the-art and best practices associated with technical leadership education and to incorporate these best practices, along with the experience of the SERC collaborators, into a technical leadership program (TLP) which would specifically focus on technical leadership in systems engineering (SE). This report presents the research, findings, and development that have occurred during the Year 1 under contract with DAU.

³ Numerous definitions of SE exist. The DoD has adopted the following formal definition, derived from EIA/IS 632, *Processes for Engineering a System*. "Systems engineering is an interdisciplinary approach encompassing the entire technical effort to evolve and verify an integrated and total life cycle balanced set of system, people, and process solutions that satisfy customer needs. SE is the integrating mechanism across the technical efforts related to the development, manufacturing, verification, deployment, operations, support, disposal of, and user training for systems and their life cycle processes. SE develops technical information to support the program management decision-making process."

⁴ Technical Management (TM) workforce is 41% or 36,704 employees in 2009 of the total acquisition population and includes systems engineering, developmental test and evaluation, and production, quality and manufacturing. All of the TM workforce would be interested in Level IV training.

The DoD has tremendous challenges in sustaining and growing its science, technology, engineering, and mathematics (STEM) workforces in support of acquisition excellence. In 2006 the DoD released its Civilian Human Capital Strategic Plan⁵ with the goal of developing, “a civilian workforce that possesses the leadership, competencies, and commitment necessary for successful mission accomplishment.” Thus, under this backdrop, research is being conducted to develop the competencies necessary for the technical leadership workforce.

SE competency topics and elements were collected from a wide variety of sources, including NASA⁶, Nokia, BAE Systems, the DoD, and the Australian government to develop our initial competency model. These models were discussed in deliverable A0009. From these competency models, possible competencies for SPRDE Level IV were identified⁷.

In summer 2010, the TLP development team discussed a possible architecture with DAU representatives. This architecture is based on the principles that there are three lenses that can be used to view TLP content, as shown in Figure 1. The lenses open an increasing aperture on a specific area, in this instance systems engineering technical leadership. Each lens covers content related to systems engineering, but at a different level.



Figure 1. Baseline Architecture Developed during Year 1.

⁵ This report can be accessed at http://prhome.defense.gov/docs/civilianstrat_plan7_9.pdf

⁶ Compiled by Wiley Larson and titled NASA's Systems Engineering Competencies as part of the Academy of Program/Project and Engineering Leadership for NASA, 2006.

⁷ We will use the term Level IV throughout this report as defined in Table 1.8. We believe that SYS 302 should be focused in developing Level III proficiencies. Whereas, SYS 351 should be mainly focused on developing professionals who oversee SE activities for a program with several systems and/or establishes SE policies at top organizational level.

The Technical Leadership Program (TLP) is a multi-disciplinary, experiential post graduate and professional development curricula that prepares senior design engineers, system engineers, and technologists for Chief Engineer, Technical Director, and Enterprise Technical Executive positions through an interactive course of independent study, simulation, and case study through the three focused lenses: Systems, Business and Team, and Enterprise and Strategy.

Using the architecture, lens learning objectives, outcomes, and focus areas were identified. The focus areas were populated with a draft list of topics. Current courseware from the SERC collaborators was compared to the topical outline for each lens to identify areas where materials exist which can be tailored to support the DAU TLP model.

The targeted learner group is high potential senior engineering designers and technologists with demonstrated superior domain engineering or technology expertise that have been identified and recommended as advanced technical leadership candidates in their organization or fields of expertise.

In 2011, the RT-4 team developed the materials for SYS350A, the systems lens, including specific learning modules for each focus area, including lectures, case studies, leadership threads focusing on non-technical skills, and group-based project work. These materials were reviewed in a Red Team with DAU and OSD representatives at the DAU main campus in Ft. Belvoir. Based on this review, the materials were updated. Pilot 1 of SYS350A was delivered to DAU instructors in September 2011. The second pilot – delivered to students – was conducted at Aberdeen Proving Grounds in Aberdeen, MD. Details of these materials and the pilots can be found in the Year 2 final report.

The RT-4 team also began development of the SYS350B (business) lens materials in Year 2, though the majority of the development occurred in Year 3.

2.2 PURPOSE OF REPORT

In 2009, the Defense Acquisition University (DAU) contracted with the Systems Engineering Research Center (SERC) to conduct research on the feasibility of teaching technical leadership and, if feasible, to develop a recommended curriculum for technical leadership. Based on the work from the Year 1, DAU has chosen to exercise its option and continue the research for Option Year 1, the primary purpose of which is to develop recommended curriculum for technical leadership and deliver this curriculum to pilot students. During Year 2, 2 pilots for the systems lens (SYS350A) were delivered.

This report represents the progress to date in developing and delivering the draft materials for the SYS350B pilot and developing the draft for SYS350C pilot materials.

3 RT-4 WORK PLAN

The major tasks for Year 3 are:

1. Develop SYS350B Pilot:
 - a. Develop Syllabus (*completed*)
 - b. Develop Storyboards for the Syllabus Segments (*completed*)
 - c. Develop Materials to support the Syllabus Segments (*completed*)
 - d. Red Team to review Pilot approach (*completed*)
2. Based on detailed architecture and draft Pilot materials, determine whether the competency alignment developed in the Year 1 is still appropriate. (*completed*)
 - a. Determine alignment of Pilot I materials with competency model. (*completed*)
3. Deliver SYS350B Pilot I (14-18 May 2012)
 - a. Delivery of Instructor Pilot (*completed*)
 - b. Assessment of Materials and Delivery (*completed*)
 - c. Analysis and Way Ahead for Revision (*completed*)
4. Revise SYS350B Pilot materials based on Pilot I feedback (*completed*)
5. Deliver SYS350B Pilot II (4-8 June 2012)
 - a. Delivery of Initial Pilot (*completed*)
 - b. Assessment of Materials and Delivery (*completed*)
 - c. Analysis and Way Ahead for Revision (*completed*)
6. Develop SYS350C Pilot:
 - a. Develop Syllabus (*completed*)
 - b. Develop Storyboards for the Syllabus Segments (*initial draft completed*)
 - c. Develop Materials to support the Syllabus Segments (*in progress*)
 - d. Red Team to review Pilot approach (*scheduled, 5 September 2012*)
7. Based on detailed architecture and draft Pilot materials, determine whether the competency alignment developed in the Year 1 is still appropriate. (*in progress*)
 - a. Determine alignment of Pilot I materials with competency model. (*in progress*)
8. Deliver SYS350C Pilot I (*scheduled, 1-5 October 2012*)
 - a. Delivery of Initial Pilot (*not started*)
 - b. Assessment of Materials and Delivery (*not started*)
 - c. Analysis and Way Ahead for Revision (*not started*)
9. Revise SYS350C Pilot materials based on Pilot I feedback (*not started*)
10. Deliver SYS350C Pilot II (*scheduled, 5-9 November 2012*)
 - a. Delivery of Initial Pilot (*not started*)
 - b. Assessment of Materials and Delivery (*not started*)
 - c. Analysis and Way Ahead for Revision (*not started*)
11. Final recommendations and report on Year 3 work (*not started*)

Additional detail on the work plan and schedule can be found in Appendix B: Milestones.

The following sections of this report detail the actions that have been completed to date (as seen in the list above).

4 DETAILED SYS350 ARCHITECTURE

This section outlines the key attributes of the SYS350 course architecture.

4.1 BASELINE ARCHITECTURE

As stated in Section 2, during Year 1, the RT-4 team developed a high-level architecture. This was the starting point for developing the detailed architecture for the SYS350 lenses. In Year 2, the Year 1 architecture was updated slightly to reflect discussion with DAU. The updated architecture can be found in Figure 3. RT-4 team also reviewed the competency alignment for the lenses, which was not altered.



Figure 2. Option Year 1 High-Level Architecture.

4.2 DEVELOPMENT OF SYS350B & C FOCUS AREAS

In Year 2, the team reviewed, refined, and revised the focus areas for each lens in light of the new architecture. A focus area is effectively a major subject area to be covered in the lens. In Year 3, the focus areas for SYS350B and SYS350C were reviewed and revised, as shown in Table 2.

Table 1. Focus Areas for the SYS350B &C Lenses

Lens	Focus Area	Descriptor
Business	Strategy	Deciding What Technology is Needed and How to Acquire It
	Technology and Innovation	Analyzing Technology Maturity, Capabilities, and Futures
	Financial Acumen	Ensuring System Decisions Fit within the Business Budget
Enterprise	Enterprise Technical Leadership	Guiding Strategic Technology Decisions
	Emerging Technology Strategies	Deciding When and How to Implement New and Emerging Technologies
	Technology Workforce Personal Development	Determining Needed Technical Capabilities and How to Improve Them
	Technology Development Strategies	Selecting Technology Families with the Best Operational Payoff

The focus areas outlined in Table 2 were used for the development of materials for the SYS350B pilots, with a full day devoted to each of these focus areas. Time was also devoted to development of student understanding of technical leadership and the scope of the business lens. In addition, each day included a focus on the non-technical skills important to leadership (e.g. communication, influence, active listening, etc.).

As the team began development on the SYS350C pilot materials, additional detail for the structure of this lens has emerged. The RT-4 team has developed a holistic view of enterprise responsibility and change and, while this does align with the focus areas, this new construct (shown in Figure 2) now provides the primary guidance for the development of SYS350C materials.

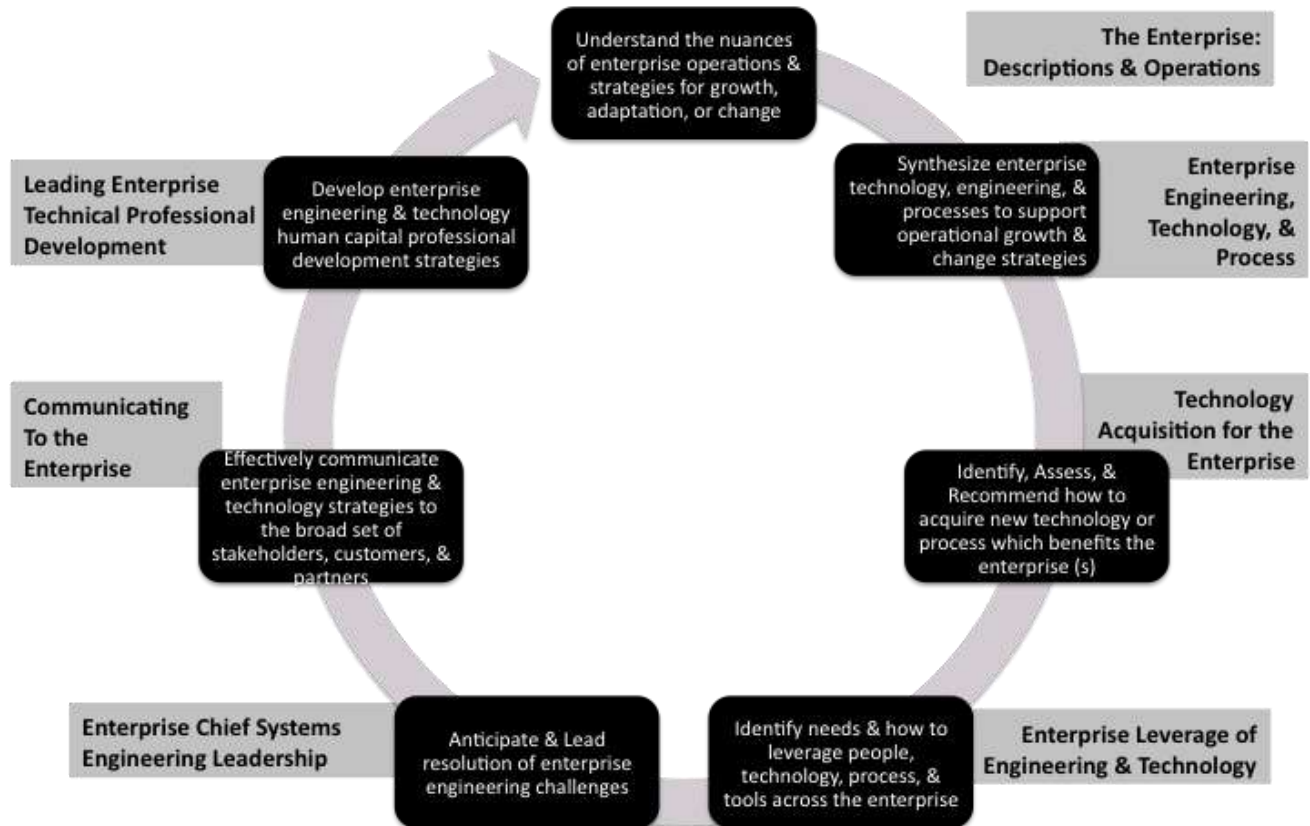


Figure 3. Iterated SYS 350C Desired Learning Outcomes Lead to Seven Segment Focus Areas

4.3 DEVELOPMENT OF COURSE DESCRIPTIONS

The RT-4 team refined the curriculum by creating course descriptions for each lens (titled SYS350A-C) during Year 2. These course descriptions followed the outline provided by DAU and included an overarching description of the lens. In addition, learning objectives for each lens were developed. In the DAU context, learning objectives describe what students should be able to do at the end of the course. Table 4. Provides the course descriptions, which have been updated based on the curriculum development of the lenses in Year 2 and Year 3.

Table 2. Objectives for Each of the SYS350 Pilots

Lens	Objectives
Systems (SYS350A)	<p>After completing Technical Leadership Development: Systems, students will be able to:</p> <ol style="list-style-type: none"> 1. Lead technical teams in analyzing complex problems, identifying technical and non-technical requirements and constraints, and deciding what

	<p>solutions to pursue and why they should be built.</p> <ol style="list-style-type: none"> 2. Help teams solve technical problems holistically, overcoming technical and non-technical challenges to bring solutions to life in spite of unforeseen obstacles and changing circumstances. 3. Ensure that the solutions developed by their teams work as intended, that they meet the needs of all stakeholders, and that they are robust across a wide range of planned and unplanned scenarios. 4. Establish and implement personal development plans for improving their technical leadership skills. 5. Lead the management and evolution of complex technical systems, deciding what and when enhancements and innovations are appropriate and how to secure the required resources to implement them.
Business (SYS350B)	<p>After completing Technical Leadership Development: Business, students will be able to:</p> <ol style="list-style-type: none"> 1. Perform a situation assessment of the business, through analysis of and interfacing with its complex external and internal constituents and environments. 2. Master analysis techniques such as cost volume profit analysis, financial forecasting and scenario planning. 3. Identify, analyze, and communicate the technology vision, mission, objectives, and strategy for their respective organizations. 4. Lead their organization to execute a specific technology strategy effectively. 5. Lead others in making ethically sound organization-wide technical decisions. 6. Apply basic principles of talent management in order to better align and leverage the technology workforce to fulfill the technology vision.
Enterprise (SYS350C)	<p>After completing Technical Leadership Development: Enterprise, students will be able to:</p> <ol style="list-style-type: none"> 1. Independently lead teams to develop enterprise technology acquisition strategies in support of organizational and business objectives. 2. Synthesize engineering and technology needs and investment strategies, objectives, and plans to support growth, adaptation, or change objectives. 3. Effectively communicate technology assessments

	<p>and recommended responses to senior operational executives.</p> <ol style="list-style-type: none"> 4. Effectively communicate enterprise engineering and technology strategies to the broad set of enterprise stakeholders, customers, and prospective enterprise partners. 5. Effectively act as the stakeholder and owner of strategically aligned enterprise engineering. 6. Apply principles of positive change management to help others recognize the need for change and pursue it constructively.
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Development of the course descriptions allowed the team to come to consensus on the key learning points for each lens. The complete course descriptions can be found in Appendix E. As the RT-4 team continues to refine a recommended curriculum and develop course materials, the materials will be compared with the objectives to ensure appropriate alignment.

Each lens (SYS350A-C) has been developed to this level. The high-level syllabus for the SYS350B (Business) and SYS350C (Enterprise) pilots are shown in Table 3 and Table 4, respectively. This baseline structure is used to develop a detailed syllabus for each of these lenses.

For SYS350A (systems), additional development was conducted to prepare for the initial SYS 350A Pilot in September 2011. Please see 4.5 Detail on SYS350B: Business Lens (below) for more detail.

4.5 Detail on SYS350B: Business Lens

The RT-4 team developed the SYS350B syllabus with specific learning modules and allocated times. Table 3 shows the final SYS350B pilot syllabus.

Table 3. Business Lens Pilot Syllabus

SYS350B (Business Lens) Pilot Syllabus	
<i>Syllabus Segments</i>	
0.	Pre-work: Explanation of Pre-Work Set
<i>Day 1</i>	
1.	Welcome & Course Overview (0:40)
2.	SYS350B Overview & Student Expectations (0:20)
3.	Expanding Systems Technical Leadership to the Business Lens (0:30)
4.	Thread Intervention: Leading versus Managing (1:00)
5.	Project: Enhancing Buying Power – Intro (1:00)
Homework: Rooster Clagett, Intel 1967-2002 and 2005	

SYS350B (Business Lens) Pilot Syllabus

Day 2 - Strategy

6. [Case Discussion: Rooster Clagett](#) (0:30)
7. [Lecture: The Concept of Competitive Strategy, Value Creation, Mission & Vision](#) (1:15)
8. [Lecture: Industry Structure and Dynamics](#) (1:15)
9. [Lecture: Macro Environmental Analysis](#) (1:00)
10. [Case Discussion: Intel 1967-2002 and 2005](#) (0:30)
11. [Thread Intervention: Influencing without Authority](#) (2:00)
12. [Project: Enhancing Buying Power](#) – In Class Work Time (0:30)

Homework: Du Pont Kevlar and HTC Corporation in 2009

Day 3 –Technology and Innovation

13. [Lecture: Technology and Innovation Management](#) (1:00)
14. [Lecture: Aligning a Technology Strategy to the Business Strategy](#) (0:30)
15. [Lecture: Strategic Technology Roadmaps and the S-Curve](#) (0:30)
16. [Lecture: Identifying, Monitoring, and Managing Emerging Technologies](#) (1:30)
17. [Case Discussion: Du Pont Kevlar and HTC Corporation](#) (1:00)
18. [Thread Intervention: Principles of Supportive Communication](#) (1:00)
19. [Guest Lecture](#) [Student Section June 7th Only] (1:00) (Note: deleted for June, 2012 pilot)
20. [Project: Enhancing Buying Power](#) – In Class Work Time (0:30)

Homework: Baidu.com - Valuation at IPO

Day 4 – Financial Acumen

21. [Lecture: Measuring and Analyzing Business and Investment Performance](#) (1:15)
22. [Lecture: Risk, Return, and the Time Value of Money](#) (1:00)
23. [Lecture: What Can You Learn about Your Current and Potential Contractors from Their Financial Statements?](#) (1:15)
24. [Case Discussion: Baidu.com - Valuation at IPO](#) (1:15)
25. [Thread Intervention: Leading Teams and Groups](#) (2:00 - 3:00)
26. [Project: Enhancing Buying Power](#) – In Class Work Time (0:30)

Homework: None

Day 5

27. [Group Project: Presentations](#) (2:00)
28. [Administrative-2: Feedback and Close](#) (0:30)

The team developed a complete set of storyboards – descriptions and learning objectives – for each segment of the syllabus. These storyboards were also reviewed with DAU and can be found in Appendix F. In general, each focus area had one to two lecture segments, one thread intervention (specific focus on technical leadership soft skills), one

to two case studies, and one project segment. The project was conducted by student teams and each project segment built upon the previous segment. For full details, please see Appendix F.

The RT-4 Team developed or selected all materials for delivery during the SYS350B pilot. A complete set of materials will be provided to DAU upon completion of RT-4.

4.6 DETAIL ON SYS350C: ENTERPRISE LENS

The RT-4 team developed an initial SYS350C syllabus and is currently working on a detailed set of storyboards for the SYS350C pilot, outlining specific learning modules and allocated times. Table 4 shows the initial SYS350C pilot syllabus, which will be reviewed at the SYS350C Red Team at DAU on 5 September 2012.

Table 4. Enterprise Lens Pilot Syllabus

SYS350C (Enterprise Lens) Pilot Syllabus	
Syllabus Segments	
0. <i>Pre-readings: Explanation of Pre-Reading Set</i>	
<i>Day 1</i>	
1.	<i>Welcome & Course Overview</i>
2.	<i>The Technical Enterprise – Descriptions & Interactions</i>
3.	<i>Understanding Your Enterprise & That of Your Stakeholders</i>
4.	<i>SYS350B Group Project Overview: Enhancing Buying Power</i>
<i>Day 2 – Theme?</i>	
5.	<i>Creating Value in the Multi-Business Enterprise</i>
6.	<i>Capturing Value in the Multi-Business Enterprise</i>
7.	<i>Enterprise Engineering, Technology, and Process</i>
8.	<i>Building Readiness for Enterprise Change</i>
9.	<i>Group Project</i>
<i>Day 3 – Theme?</i>	
10.	<i>Enterprise Engineering, Technology, & Process II</i>
11.	<i>Technology Acquisition for the Enterprise</i>
12.	<i>Enterprise Leverage of Engineering & Technology</i>
13.	<i>Tools for Leading Enterprise Change</i>
14.	<i>Group Project</i>
<i>Day 4 – Theme?</i>	
15.	<i>The Senior Technical Leader: Leading at the Enterprise Level</i>
16.	<i>The Senior Technical Leader: Effectively Communicating at 360°</i>

SYS350C (Enterprise Lens) Pilot Syllabus

17. [*Leading Enterprise Professional Development*](#)
18. [*You as an Enterprise Change Agent*](#)
19. [*Group Project*](#)

Day 5

20. [*Student Presentations*](#)
21. [*Feedback*](#)

The team has developed a complete set of storyboards – descriptions and learning objectives – for each segment of the syllabus. These storyboards will be reviewed with DAU on 5 Sep 2012 and can be found in Appendix F.

5 SYS350 ASSESSMENT

Assessment is an important aspect of the RT-4 work. Assessments are used to allow students in the pilots to provide feedback on the content, documentation, and presentation of the SYS350 materials. This feedback is used to adjust the pilots and develop final recommendations on the most appropriate way to teach technical leadership.

As discussed in the Year 2 final report, the RT-4 team began by examining evaluation documents from a few current DAU courses. The Kirkpatrick training evaluation framework is useful for discussing the level and depth of assessment (Kirkpatrick and Kirkpatrick 2006):

- **Kirkpatrick Level 1: Reaction.** At this level, assessment efforts are focused on gathering students' perceptions on the course and their overall reaction – positive or negative – to the instruction.
- **Kirkpatrick Level 2: Learning.** At this level, assessment efforts are focused on determining the extent to which students have absorbed the knowledge presented in the course.
- **Kirkpatrick Level 3: Application.** At this level, assessment efforts are focused on whether the students have been able to apply the principles and/or techniques learned during the course in their work.
- **Kirkpatrick Level 4: Environmental Change.** At this level, assessment efforts are focused on whether the student(s) has been able to effect change in his/her work environment. This goes beyond individually applying the information learned to supporting cultural change that allows this knowledge to be better utilized.

The team determined that Kirkpatrick Level 1 and 2 assessments are the most appropriate for the SYS350 pilots. The team has been conducting assessment of the

5.1 SYS350A – ADDITIONAL PILOT ASSESSMENT

The results of the instructor pilot and the first student pilot were reported in the Year 2 report.

For the second student pilot conducted at DAU-S, Huntsville, AL, the RT-4 team collected data using two mechanisms. First, Dr. Pennotti led each group through a series of free-form feedback exercises; then, the students completed a standard feedback

form. Stevens developed this form; there are over 10,000 data points using this form, so that statistics can be normalized when using this form.

5.1 SYS350A ASSESSMENT – RT-R HUNTSVILLE PILOT FEEDBACK

The assessment rubric includes several questions about the instruction and the pilot materials. The complete assessment rubric used for the pilots can be found in Appendix G; a list of the questions utilizing the Likert-scale is found below.

Instructor evaluation:

1. Explain the objectives of the course clearly
2. Are prepared for class
3. Present material in an organized manner
4. Have command of their subject
5. N/A
6. Successfully communicate the subject
7. Are fair and consistent
8. OVERALL – The instructors were effective teachers

Course evaluation:

9. The course is well structured
10. The course material (notes and books) is well organized
11. The material was adequately covered in the allotted time
12. The course was structured to facilitate discussion and participant contribution
13. The subject matter has significant usefulness to my organization
14. I can apply what I have learned in this course on projects (underway or future) in my organization
15. The course will enable me to enhance my career objectives
16. OVERALL – This was an Excellent Course

Figure 4 below provides an overview of the students' responses to the second SYS 350A Systems student pilot conducted at DAU-S, Huntsville, AL in April 2012. Students were asked to respond to the questions above using a Likert scale; in this case, 1 represents "strongly disagree" while 5 represents "strongly agree". As seen in Figure 4, students generally assess all aspects of this SYS350-A course in the "agree" to "strongly agree" range. The one exception was item ten – organization of course materials. This feedback was similar to that received in the first two SYS350-A pilots. The approach for SYS350-B, therefore, was changed with better results (please see Section 5.2, below).

It should be noted that because this is a standard assessment form, item five was deemed not applicable for the assessment of these pilots. For this reason, there is no data for item five.

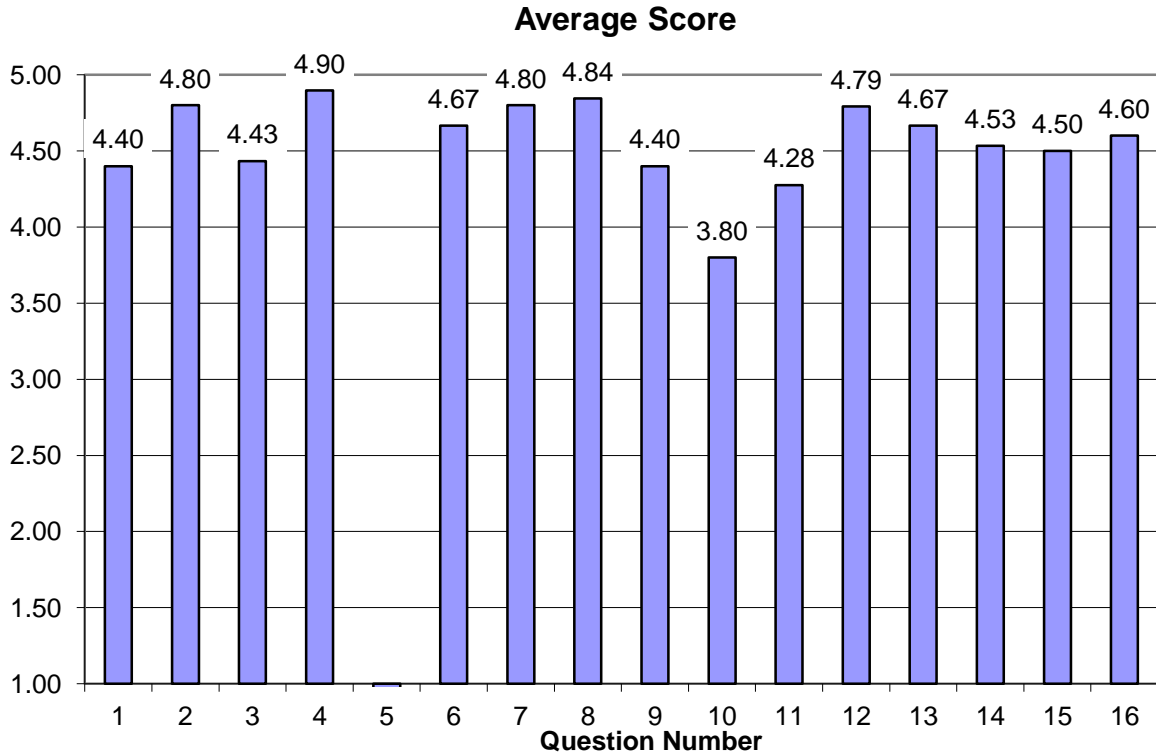


Figure 4. Overview of the Average Scores for Each Question on the Assessment Rubric for the April 2012 SYS350-A Pilot in Huntsville, AL. Scores are on a Likert scale (1, “strongly disagree” to 2 “strongly agree”).

Figure 5 shows the percentage of students who “strongly agreed” with the affirmative statements provided in the assessment form. Again, item ten – organization of materials – shows the lowest response. Items nine and eleven are also both below 50% “strongly agree” – these items correspond to course organization and coverage of material in allotted time. Again, these issues were taken into consideration going forward to SYS350-B.

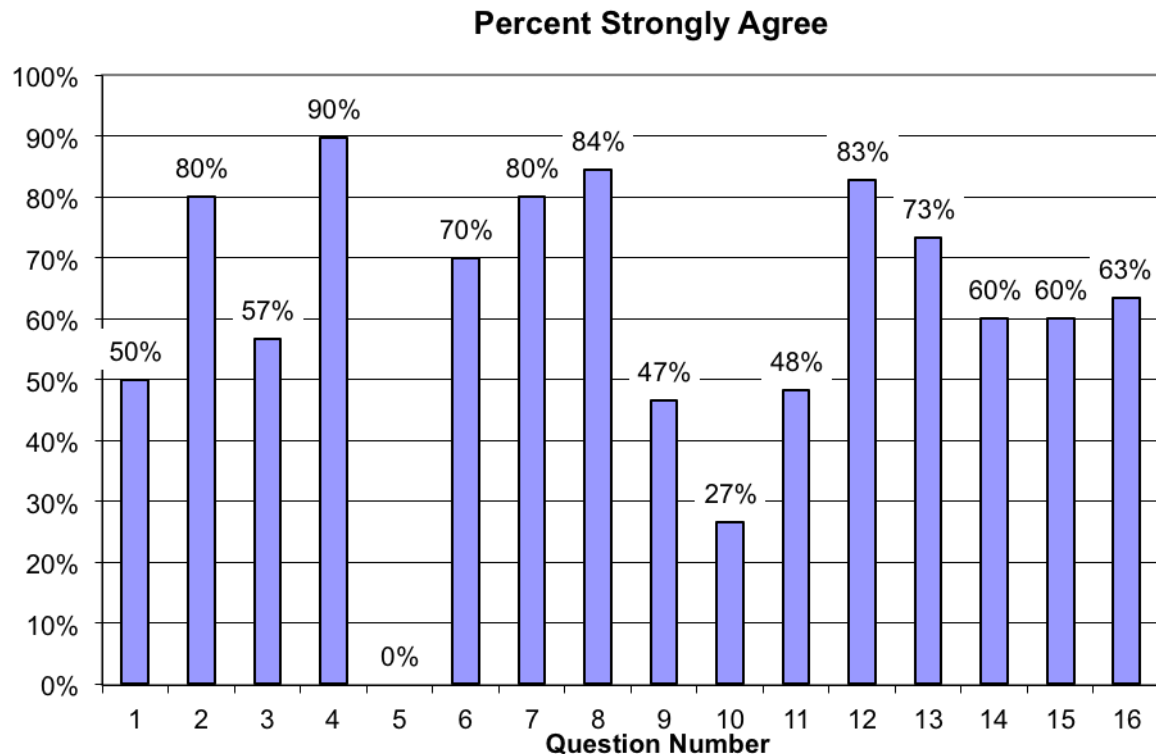


Figure 5. Percentage of Students Who “Strongly Agree” with the Assessment Criteria for the SYS350-A Huntsville Pilot

The following sections provide an overview of the free-form responses received as part of the SYS350-A Huntsville pilot assessment.

5.1.1 THE THING THAT I LIKED BEST ABOUT THIS COURSE WAS...

The following are student responses to the open-text prompt, “The thing that I liked best about this course was . . .”:

- **Discussions:**
 - The case studies and conversations with the other SEs during the class.
 - The discussions. Ample time was spent for the class comments/discussions which added to the material.
 - Discussion and examples. And it emphasized engineering leading projects.
 - Ability to discuss the people aspect of management. This tends to get lost in the rapid pace of program life.
 - Lectures were on point and informative. Clearly know the material. Open discussion was useful!!!!
 - Lessons learned; class discussion.

- The time to actually converse and talk about problems we really deal with day to day
- **Personal Leadership Skills:**
 - The self-examination of my leadership attributes and how to improve or work toward eliminating bad traits.
 - The organizational psychology piece.
 - The technical systems engineering was integrated with the behavior/soft topics. Made the class very interesting by not staying on one topic for long periods of time.
- **Case studies:**
 - While board exercises based on current case studies. Good thought provoking activity.
 - Excellent facilitators and discussion. The short case studies.
- **Experienced Instructors:**
 - Knowledge of the instructors and the AR2D2 discussions.
 - Experience of instructors. Mix of technical and psychological experience.
 - The comfortable environment while in a room of experts...very rare. The course was very well presented and organized. All instructors showed real knowledge and skills.
- **Real-world examples:**
 - Including experiences of other leaders and outside tools of successful, accomplished people was invaluable. Allowed us to benefit from various business cultures that we do not normally receive.
 - Real example.
- **Other:**
 - Enjoyed the course. Am interested in seeing what 350B and 350 C cover.
 - This is by far the best DAU class that I have attended. The material is very pertinent to all government engineering teams.
 - Leadership lessons learned and request feedback. Dealing with complex systems.
 - Reinforced some previous leadership training; included a new perspective on other areas.
 - Leadership concepts; “big picture” perspective.
 - It was good given the perceived need.
 - Everything.
 - Awesome course. Very informative.

5.1.2 IF I COULD CHANGE ONE THING ABOUT THIS COURSE, I WOULD...

The following are student responses to the open-text prompt, “If I could change one thing about this course, I would . . .”:

- **Longer/more time for discussion:**

- Add a few more breaks. Start program on Monday morning so to ensure instructors are not rushed and allow for maximum student/teacher interactive conversations.
- Longer and make it residential.
- Make the time frame for the course longer. It really needs another three days to one week to allow for discussions and participation by the class. This was one of the only negatives I had about the class.
- Expand to normal 4-1/2 day DAU class to give a little more time for the subject matter.
- Longer time allotted for the project.
- Would have liked more classroom interactive group discussion time.
- Needs to be five full days.
- Allow a little more time for discussion. Do the case study AR2D2 in the morning sessions.
- Smaller class and more discussion.
- **Add some elements:**
 - I had rather be engaged more with examples as opposed to doing team exercises. The AR2D2 example was great but I would have liked to evaluate it in a group environment besides breaking up into teams.
 - More cases on leadership roles.
 - Add more quick, hard-hitting examples with one or two key points to highlight and a short class discussion. Smaller class size would be better. Pick up pace to cover more.
 - Include leadership “lab” scenarios... for students to role play and discuss.
 - Add some discussion on time management.
- **Target the audience more narrowly:**
 - Target first time leaders with some experience, 1-3 years. It could also be offered as a refresher to seasoned leaders.
 - Offer to selected, more junior engineering leaders that would benefit from the shortened leadership development timeline and offer. More seminar basis with guest speakers to show case studies.
 - I thought it was directed toward a less experienced audience. I thought it was for senior leaders. Not that refresher training isn’t needed, it is not what I expected.
- **More Government focus:**
 - Focus on applications to government; this course presented good concepts but they are applied differently in government, usually with unsuccessful outcomes.
 - Mix some aspect of government unique issues with industry lessons.

5.1.3 GENERAL COMMENTS

The following are student responses to the free-text general comments solicited in the assessment rubric:

- Suggest providing a one-page consolidated book list.
- Allow time for reading in class to eliminate homework.
- Asking students to read something in class should be a banned activity. There is too much noise and the instructor never really quits talking. The material to be covered really takes more time.
- Weeklong case studies/projects are inappropriate for a course like this. There is not enough time to do any real analysis and study. Just present it. The material to be covered usually takes weeks or months to understand.
- Significant amount of time spent on case study. May be more effective to focus on shorter times and more examples with lessons learned.
- Less of the RZOC [sic]. It was a good case study but spent way too much time on it!
- Introduce elements of this course on each level of SPRDE-SE so that this course will tie all elements at the end. I also hope this course is applied to other certifications, like test and evaluation and similar others.
- One of the best DAU courses I have taken; very relevant to the issues I face on a day-to-day basis. I really, really, really want to be part of the other two lenses (350B and 350C).
- I will be seeking more info on this and other courses to help me determine education/training opportunities to bring to MDA.
- Very excellent course; should be aimed at all engineers. Should probably not be made into a SPRDE Level 4, but instead become a required part of SPRDE Level 3.
- This is not just relevant for SPRDE but T&E. I would say allow more access to the course. B-2 (organized notes and books) rated lowest but I recognize this is a pilot class. I would be interested in the B & C versions of the SYS 350 class sequence.
- This should really be for middle to senior leaders, at least until all have learned it, before getting the younger engineers. They need to understand the systems engineering “rules” and where they come from! Need to bring in senior PMs, PEMs and other leaders.
- This info is needed and should also be taught at more junior levels, as well.
- Offer to younger engineers.
- Good refreshment of material and new concepts. Instructors very knowledgeable with subjects and they demonstrate the material/concepts by real life examples.
- The course enforced creative thinking.

- Re: question A-1 – if objective completely explained, the secret would be let out and ruin the class method.
- Needed an introduction of people in the room!! Teams should be changed each day to allow interaction with all. DAU asked for bio prior and said we would get compilation of them first day.
- It would be great to have an electronic copy of the material vs. binder.
- Difficult at first to understand the “themes”; once acknowledged as perspectives, provided a good balance to the course.
- I think the real problem is the lack of a consistent message from top management. We need a balance between rapid acquisition and up front planning and analysis.
- Outstanding, great faculty!! I wish I had the opportunity to take something like this when I got my Level 3 certification. Perhaps making the course a requirement for Level 3 certification may be better than making it a Level 4.
- Best course from DAU ever! Most relevant! Most enjoyable! I feel energized instead of drained!

5.2 SYS350B ASSESSMENT RT-4 PILOT FEEDBACK

The assessment approach used in SYS350A – both free form and structured feedback – was utilized in SYS350B pilots as well. Ms. Hutchison led the groups through the free-form exercises for the instructor and student pilots. The results of the feedback from both SYS350B pilots are discussed below.

The first half of the assessment focused on the students’ responses to the instructors. The form was focused on specific prompts, to which the students’ respond on a Likert scale (strongly disagree to strongly agree). The prompts for instructor feedback were:

- Explain the objectives of the course clearly
- Are prepared for the class
- Present material in an organized manner
- Has command of their subject
- Successfully communicate the subject
- Are fair and consistent
- OVERALL – The Instructors were an Effective Teachers

In general the group responses were positive; a summary of the responses can be found in Figure 6. For the first question – whether the objectives were clearly explained – only the lower scores are not surprising – because this was a pilot program, there are objectives both of a traditional course (student objectives) as well as research objectives. It is likely that the discussion of both types of objectives was confusing to students. This trend was seen primarily in the instructor pilot; based on this feedback; the introductory

materials were updated and expanded. Subsequently, the assessment showed improved understanding of the pilot objectives for the student pilot.

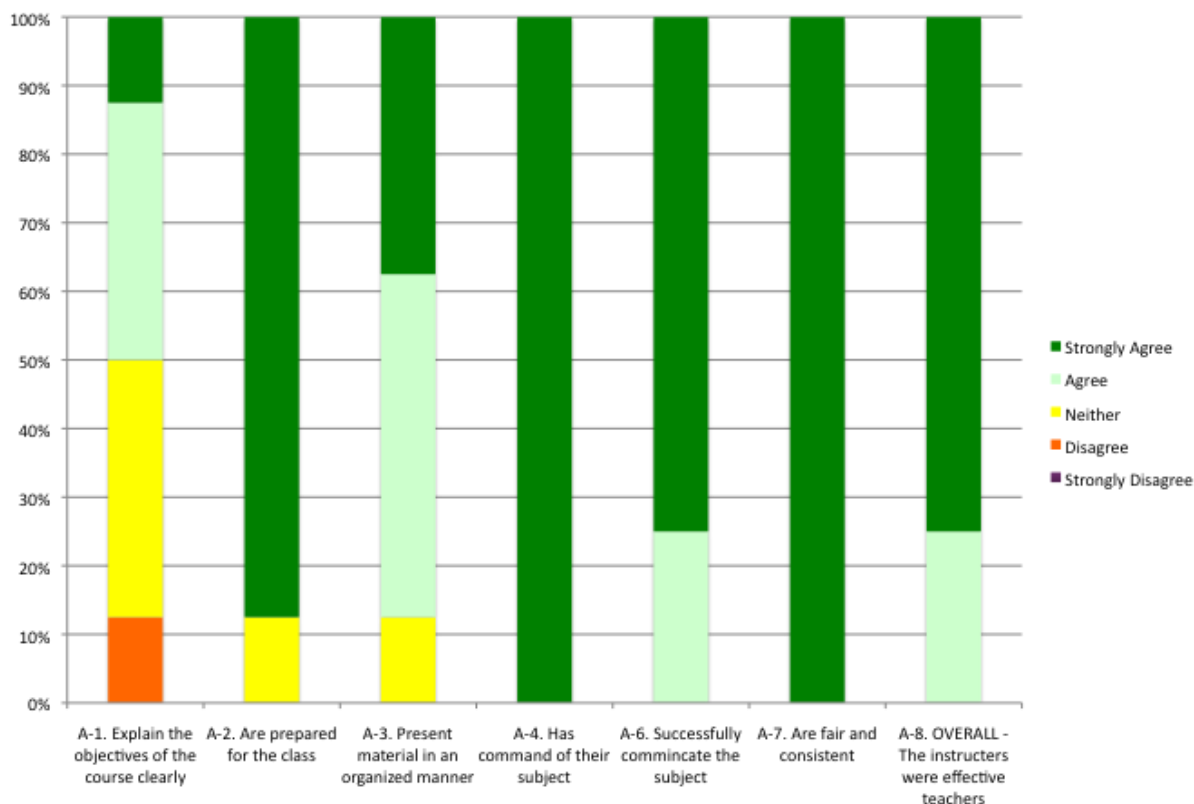


Figure 6. Feedback on Instructors for SYS350B (both pilots).

The second half of the evaluation form focused on the pilot itself, namely focusing on the level to which the pilot met the following expectations:

- The course is well structured
- The course material (notes and books) are well organized
- The material was adequately covered in the allotted time
- The course was structured to facilitate discussion and participant contribution
- The subject matter has significant relevance and usefulness to my organization
- I can apply what I have learned in this course on projects (underway or future) in my organization
- The course will enable me to enhance my future career objectives
- OVERALL – This was an Excellent Course

A summary of the results can be found in Figure 7. In general, both groups agreed that the course was relevant and would be helpful to them in their current and future roles. The two main issues identified in feedback were organization of materials and coverage of material in the allotted time. Organization was due in part to the way materials were

delivered in the instructor pilot; the organization was updated for the student pilot and this group generally agreed that the materials were better structured. In terms of coverage in the allotted time, the RT-4 team recognizes that this is a problem. In general, the amount of material believed to be required for a student to be adequately exposed to each of the focus areas is substantial. Because the modules all include group exercises and are not straight lectures, some activities took longer than planned. Final recommendations for SYS350B will include areas where the materials could be shortened and modules that should require additional time. It should be noted that in the first SYS350B pilot, the group met for only a half day on Day 1; with DAU approval, Day 1 for the student pilot was made a full day. The scores for coverage in the allotted time were improved in the student pilot.

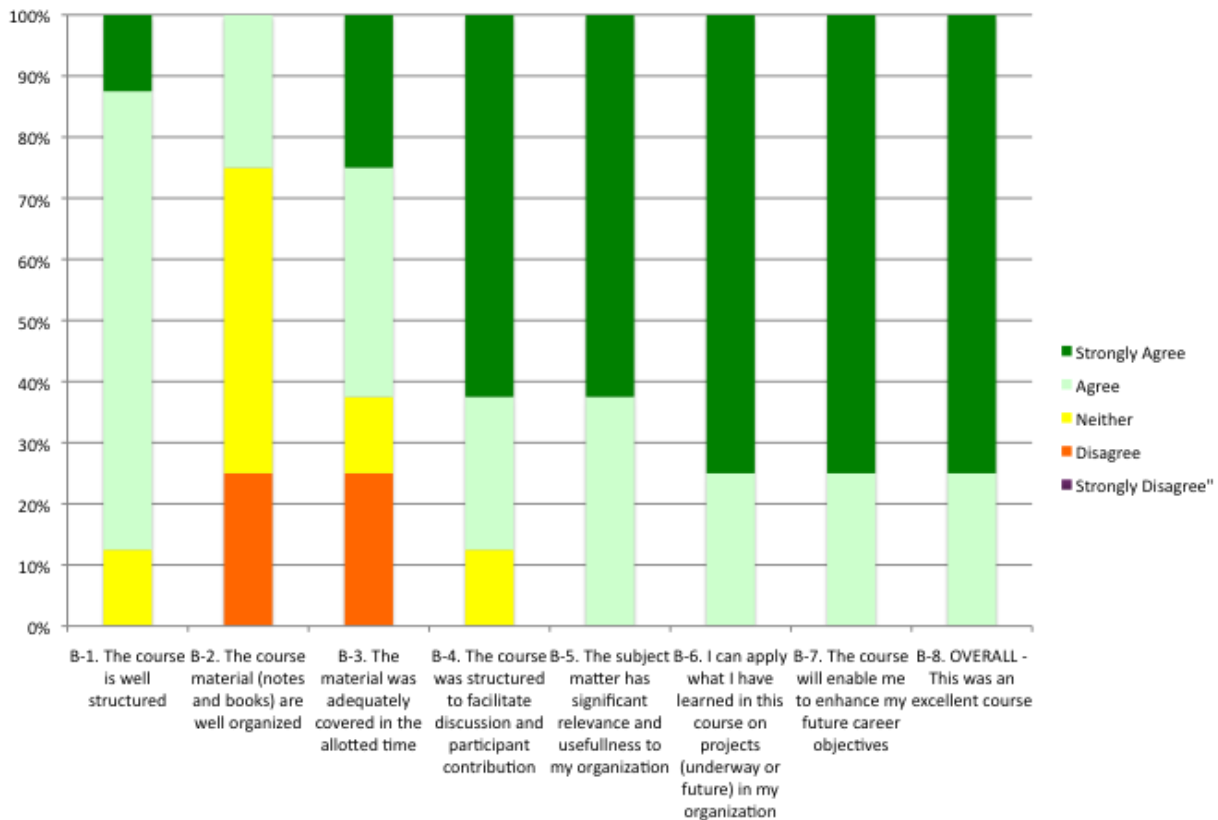


Figure 7. Content Assessment from SYS350B (both pilots).

Finally, the RT-4 team compared the results of the pilot assessments from the two SYS350A student pilots and the SYS350B student pilot. These findings are summarized in Figure 8. It should also be noted that the SYS350-A and 350-B student pilots conducted at Aberdeen were a relatively identical, more junior cohort whereas the SYS-350A student pilot in Huntsville was, in general, a more senior cohort. No detailed correlation analysis was performed in this regard but it is noteworthy that the 'control'

groups were not identical with respect to experience, specific technology and systems applications, command processes, and geographical location. This pilot evaluation shows the percentage of participating students who “strongly agree” with each assertion. In general, these results show that students were relatively receptive to and comfortable with the learning outcomes and their learning achievements during the pilot. It is interesting to note that large percentages of students across the pilots strongly agreed that the pilot supported both their current and future career goals. This result supports a claim that this educational approach can be made relevant for professional development within the SPRDE career field.

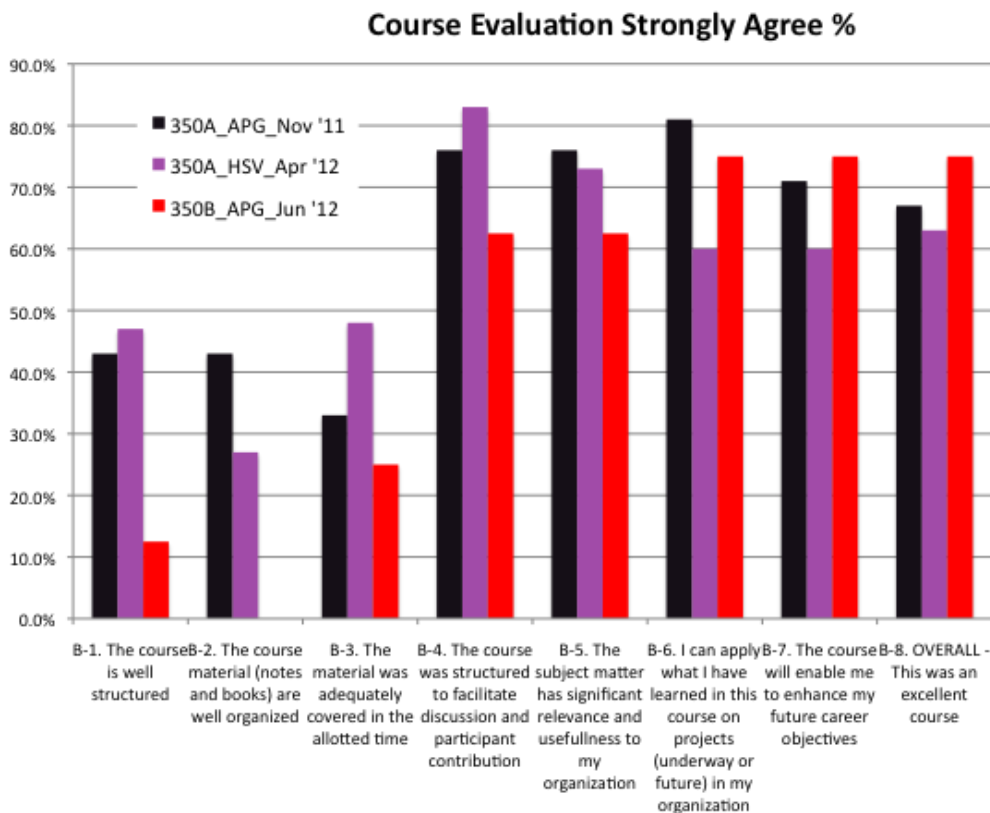


Figure 8. Comparison of Pilot Reviews from All Student Pilots (SYS350A and B).

6 WAY AHEAD

The first RT-4 Pilot for SYS350C is scheduled for 1-5 October 2012 for DAU faculty and OSD staff members. This will be an instructor pilot – allowing subject-matter experts within DAU to review the materials and provide feedback on them. This feedback will be used to update the materials and prepare for the second pilot, which will be held 5-9 November 2012 with students from the SPRDE career field. At this time it is believed that the cohort from Aberdeen Proving Grounds will continue through SYS350C. Following completion of the SYS350C pilots, a final report, including recommendations and copies of all lens materials will be delivered to DAU.

APPENDICES

[Appendix A. References](#)

[Appendix B. Milestones](#)

[Appendix C: Alignment of Focus Areas/Objectives](#)

[Appendix D. Course Descriptions](#)

[Appendix E: SYS350B – Storyboards](#)

[Appendix F: SYS350C Storyboards](#)

[Appendix G: RT-4 Pilot Assessment Rubric](#)

APPENDIX A. REFERENCES

Kirkpatrick, D. L., & Kirkpatrick, J. D. (2006). *Evaluating Training Programs* (3rd ed.). San Francisco, CA, USA: Berrett-Koehler Publishers, Inc.

APPENDIX B. MILESTONES

Year 2

January 2012

- ***Systems Lens Report and Final Deliverables***
 - Specific delivery dates to be finalized with DAU
 - Potential dates for delivery have been submitted (awaiting feedback)
 - Report will document the results of the two Systems lens pilots, provide recommendations for classroom coverage of technical leadership, and provide copies of all materials (in progress)
- ***Business Lens Development***
 - Initial architecture (in draft)
 - Initial planning of topics/schedule/thread integration (in draft)
 - Course descriptions (under revision)
 - SYS350B storyboards (in progress)
 - SYS350B evaluation template (not started)

Year 3

February 2012

- ***Business Lens (SYS350B) Red Team***
 - Red Team meeting with DAU to review draft pilot materials
 - Dates submitted, but no final date selected (awaiting feedback)
- ***Business Lens (SYS350B) Pilot Preparation***
 - Schedule pilot (dates submitted, awaiting feedback)
 - Book pilot facilities (not started)

February 17, 2012 Year 2 Final Report

March 2012

- Develop materials for SYS350B red team
- Red Team Date (completed)

April 2012

- Develop materials for SYS350B red team (complete)
- April 13 – SYS350B Red Team at DAU (complete)
- April 16-20 – SYS350A Pilot 3 at Redstone Arsenal (complete)

May 2012

- May 14-18 - SYS350B instructor pilot at DAU (materials submitted to DAU)
- May 21-25 – Update of SYS350B materials based on instructor feedback

June 2012

- June 4-8 –SYS350B student pilot, tentatively at Aberdeen Proving Grounds (awaiting final confirmation on location)

July 2012

- Analysis of feedback from 350B pilots and update of 350B materials
- Preparation for 350C red team

August 2012

- 350C Storyboard Development
- 350C Project Development
- Delivery of interim report, including analysis from SYS350B

September 2012

- September 5 – 350C red team
- 350C material development
- Logistical preparations for instructor pilot

October 2012

- October 1 – 5, 2012: SYS350C instructor pilot

November 2012

- November 5 – 9, 2012: SYS350C student pilot

December 2012

- Final report on year 3 – delivery of all SYS350B and C materials
- End Year 3

APPENDIX C: ALIGNMENT OF FOCUS AREAS/OBJECTIVES

The objectives for each of the lenses (SYS350A-C) are defined in the course descriptions. The focus areas are discussed in the architecture discussion. This appendix shows the rough alignment analysis conducted by the RT-4 team. The purpose of this exercise was to ensure that the objectives identified should appropriately support the focus areas identified in the architecture. Note that the SYS350C focus areas evolved during year 3 of the research from the original framework and are shown after the original 350C focus areas below in Appendix C.3.

C.1 SYS350A: SYSTEMS LENS

	Systems Lens Focus Areas			
Systems Lens Desired Learning Objectives	Architectural Innovation	Technical Value Proposition	Customer Expectation Management	Technical Resource Planning
Lead technical teams in analyzing complex problems, identifying technical and non-technical requirements and constraints, and deciding what solutions to pursue and why they should be built.	X	X	X	X
Help teams solve technical problems holistically, overcoming technical and non-technical challenges to bring solutions to life in spite of unforeseen obstacles and changing circumstances.		X		X
Ensure that the solutions developed by their teams work as intended, that they meet the needs of all stakeholders, and that they are robust across a wide range of planned and unplanned scenarios.		X	X	
Establish and implement personal development plans for improving their technical leadership skills				X
Lead the management and evolution of complex technical systems, deciding what and when enhancements and	X			X

innovations are appropriate and how to secure the required resources to implement

C.2 SYS350B: BUSINESS LENS

	Business Lens Focus Areas			
Business Lens Desired Learning Objectives	Business Acquisition Strategy	Technology Assessment	Financial Acumen & Analysis	Technology Implementation
Perform a situation assessment of the business, through analysis of and interfacing with its complex external and internal constituents and environments.	X	X		
Master analysis techniques such as cost volume profit analysis, financial forecasting and scenario planning.			X	
Identify, analyze, and communicate the technology vision, mission, objectives, and strategy for their respective organizations.	X			X
Lead their organization to execute a specific technology strategy effectively.		X		X
Lead others in making ethically sound organization-wide technical decisions.	X	X		
Apply basic principles of talent management in order to better align and leverage the technology workforce to fulfill the technology vision.				X

C.3 SYS350C: ENTERPRISE LENS

	Enterprise Lens Focus Areas (Original Baseline)
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Enterprise Lens Desired Learning Objectives	Enterprise Technical Leadership	Emerging Technology	Technology Workforce Personal Development	Technology Development Strategies
Independently lead teams to develop enterprise technology acquisition strategies in support of organizational and business objectives.	X		X	X
Synthesize engineering and technology needs and investment strategies, objectives, and plans to support growth, adaptation, or change objectives.		X	X	X
Effectively communicate technology assessments and recommended responses to senior operational executives.		X	X	X
Effectively communicate enterprise engineering and technology strategies to the broad set of enterprise stakeholders, customers, and prospective enterprise partners.	X		X	
Effectively act as the stakeholder and owner of strategically aligned enterprise engineering.	X		X	
Apply principles of positive change management to help others recognize the need for change and pursue it constructively			X	X

350C Focus Areas July 2012	THE ENTERPRISE Understand the nuances of enterprise operations & strategies for growth, adaptation, or change	ENTERPRISE ENGINEERING Synthesize enterprise technology, engineering, & processes to support operational growth & change strategies	TECH ACQ Identify, Assess, & Recommend how to acquire new technology or process which benefits the enterprise (s)	ENT LEVERAGE Identify needs & how to leverage people, technology, process, & tools across the enterprise	CHIEF ENGR Anticipate & Lead resolution of enterprise engineering challenges	ENT COMMS Effectively communicate enterprise engineering & technology strategies to the broad set of stakeholders, customers, & partners	PROF DEV LEADER Develop enterprise engineering & technology human capital professional development strategies
March 2011 Course Descriptions							
Independently lead teams to develop enterprise technology acquisition strategies in support of organizational and business objectives.	COURSE OBJECTIVE EXPANSION		X		COURSE OBJECTIVE EXPANSION		COURSE OBJECTIVE EXPANSION
Synthesize engineering and technology needs and investment strategies, objectives, and plans to support growth, adaptation, or change objectives.		X					
Effectively communicate technology assessments and recommended responses to senior operational executives.						X	
Effectively communicate enterprise engineering and technology strategies to the broad set of enterprise stakeholders, customers, and prospective enterprise partners						X	
Effectively act as the stakeholder and owner of strategically aligned enterprise engineering.				X			
Apply principles of positive change management to help others recognize the need for change and pursue it constructively						X	

APPENDIX D. COURSE DESCRIPTIONS

The following course descriptions were developed for DAU SYS350 courses and were delivered to DAU in May 2011.

D.1 SYS350A: SYSTEMS LENS

Description

This course provides foundational and pragmatic processes and methods for SPRDE systems engineers and program systems engineers who aspire to expand their technical leadership roles and responsibilities in Key Leadership Positions (KLPs). The student will be afforded the opportunity to develop and refine their skills in analyzing complex technical problems, synthesizing holistic solutions, and making sound judgments in the presence of high ambiguity, rapid change and challenging non-technical constraints. It provides a leadership perspective for experienced systems engineers who have demonstrated superior domain engineering or technology expertise, and who are likely to assume technical leadership positions in the near future. The course also introduces basic principles of personal leadership development. Students will gain deeper insight to their own strengths and development needs when it comes to leading others in technology driven projects and programs. Courses are taught in a highly interactive manner, using real world case studies and projects.

Objectives

After completing Technical Leadership Development: Systems, students will be able to:

5. Lead technical teams in analyzing complex problems, identifying technical and non-technical requirements and constraints, and deciding what solutions to pursue and why they should be built.
6. Help teams solve technical problems holistically, overcoming technical and non-technical challenges to bring solutions to life in spite of unforeseen obstacles and changing circumstances.
7. Ensure that the solutions developed by their teams work as intended, that they meet the needs of all stakeholders, and that they are robust across a wide range of planned and unplanned scenarios.
8. Establish and implement personal development plans for improving their technical leadership skills.
9. Lead the management and evolution of complex technical systems, deciding what and when enhancements and innovations are appropriate and how to secure the required resources to implement them.

Target Attendees

This course is for individuals serving in or targeted for Key Leadership Positions (KLPs) within the SPRDE-SE or SPRDE-PSE career track.

Prerequisite(s)

- SYS 101, Fundamentals of Systems Planning, Research, Development, and Engineering
- SYS 202, Intermediate Systems Planning, Research, Development, and Engineering, Part I
- SYS 203, Intermediate Systems Planning, Research, Development, and Engineering, Part II
- SYS 302, Technical Leadership in Systems Engineering

Course Length

4 days

Additional Course Information

Delivery Mode: Resident

Pilot POC

Michael Pennotti, PhD
Associate Dean for Academics
School of Systems and Enterprises
Stevens Institute of Technology
973-632-8836
michael.pennotti@stevens.edu

D.2 SYS350B: BUSINESS LENS**Description**

This is a case-based, highly interactive course that focuses on the strategic business dynamics and leadership responsibilities required for acquiring systems that meet strategic organizational needs of technically focused businesses. Participants will be guided in how to rigorously assess the current state of the organization through analyzing, interfacing with, and gathering information related to external factors (e.g., regulatory and governing bodies; potential suppliers) and internal factors (e.g., internal core technologies and competencies; human and financial resources; intellectual property). Informed by this analysis, participants will then be exposed to methods for formulating and implementing future competitive strategy. Related activities include vision and mission analysis, goal setting, developing technology roadmaps, budgeting, planning for, and developing engineering and technical human capital, analyzing technology make or buy decisions, performing technology supply chain assessments, financial forecasting, and implementing change management.

Special emphasis in the course will be placed on emerging technologies. Students will contrast and compare approaches to assessing the maturity and systems applicability of emerging technologies versus mature technologies. A broad overview of today's relevant emerging technologies will be conducted through an examination of emerging technologies that have the potential to transform defense-related industries. This course also helps

individuals build their interpersonal skills and leadership techniques for developing others, and guiding them in complex system decision-making.

Objectives

After completing Technical Leadership Development: Business, students will be able to:

7. Perform a situation assessment of the business, through analysis of and interfacing with its complex external and internal constituents and environments.
8. Master analysis techniques such as cost volume profit analysis, financial forecasting and scenario planning.
9. Identify, analyze, and communicate the technology vision, mission, objectives, and strategy for their respective organizations.
10. Lead their organization to execute a specific technology strategy effectively.
11. Lead others in making ethically sound organization-wide technical decisions.
12. Apply basic principles of talent management in order to better align and leverage the technology workforce to fulfill the technology vision.

Target Attendees

This course is for individuals serving in or targeted for Key Leadership Positions (KLPs) within the SPRDE-SE or SPRDE-PSE career track.

Prerequisite(s)

- SYS 101, Fundamentals of Systems Planning, Research, Development, and Engineering
- SYS 202, Intermediate Systems Planning, Research, Development, and Engineering, Part I
- SYS 203, Intermediate Systems Planning, Research, Development, and Engineering, Part II
- SYS 302, Technical Leadership in Systems Engineering

Course Length

4 days

Additional Course Information

Delivery Mode: Resident

Pilot POC

Ann Mooney Murphy, PhD
Associate Dean and Director of Undergraduate Studies
Wesley J. Howe School of Technology Management
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D.3 SYS350C: ENTERPRISE LENS

Description

This course covers topics for enterprise leaders of groups of technically focused businesses. It focuses on the role of the technology leader in formulating and executing corporate strategy, and in leading change within it.

It is organized into two parts. Part 1 develops students' ability to apply concepts and tools in order to support 1) valuing existing technological and related resources 2) creating value by leveraging existing technological and other resources and minimizing transaction costs, 3) creating value through geographical expansion, 4) creating value through product expansion, and 5) creating value by acquiring new technological and related resources.

Part 2 develops students' capacity to apply principles, tools and techniques for understanding and diagnosing organizations as dynamic social systems and methods for leading organization-wide change, be it for creating something new or for revitalizing dormant capabilities and potential.

The course stresses experiential learning and draws heavily interactive cases, group discussion and simulations.

Objectives

After completing Technical Leadership Development: Enterprise, students will be able to:

7. Independently lead teams to develop enterprise technology acquisition strategies in support of organizational and business objectives.
8. Synthesize engineering and technology needs and investment strategies, objectives, and plans to support growth, adaptation, or change objectives.
9. Effectively communicate technology assessments and recommended responses to senior operational executives.
10. Effectively communicate enterprise engineering and technology strategies to the broad set of enterprise stakeholders, customers, and prospective enterprise partners.
11. Effectively act as the stakeholder and owner of strategically aligned enterprise engineering.
12. Apply principles of positive change management to help others recognize the need for change and pursue it constructively

Target Attendees

This is course is for individuals serving in or targeted for Key Leadership Positions (KLPs) within the SPRDE-SE or SPRDE-PSE career track.

Prerequisite(s)

- SYS 101, Fundamentals of Systems Planning, Research, Development, and Engineering
- SYS 202, Intermediate Systems Planning, Research, Development, and Engineering, Part I
- SYS 203, Intermediate Systems Planning, Research, Development, and Engineering, Part II
- SYS 302, Technical Leadership in Systems Engineering

Course Length

4 days

Additional Course Information

Delivery Mode: Resident

Pilot POC

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APPENDIX E: SYS350B – STORYBOARDS

Syllabus Segments

0. [Pre-work: Explanation of Pre-Work Set](#)

Day 1

1. [Welcome & Course Overview](#) (0:40)
2. [SYS350B Overview & Student Expectations](#) (0:20)
3. [Expanding Systems Technical Leadership to the Business Lens](#) (0:30)
4. [Thread Intervention: Leading versus Managing](#) (1:00)
5. [Project: Enhancing Buying Power](#) – Intro (1:00)

Homework: Rooster Clagett, Intel 1967-2002 and 2005

Day 2 - Strategy

6. [Case Discussion: Rooster Clagett](#) (0:30)
7. [Lecture: The Concept of Competitive Strategy, Value Creation, Mission & Vision](#) (1:15)
8. [Lecture: Industry Structure and Dynamics](#) (1:15)
9. [Lecture: Macro Environmental Analysis](#) (1:00)
10. [Case Discussion: Intel 1967-2002 and 2005](#) (0:30)
11. [Thread Intervention: Influencing without Authority](#) (2:00)
12. [Project: Enhancing Buying Power](#) – In Class Work Time (0:30)

Homework: Du Pont Kevlar and HTC Corporation in 2009

Day 3 –Technology and Innovation

13. [Lecture: Technology and Innovation Management](#) (1:00)
14. [Lecture: Aligning a Technology Strategy to the Business Strategy](#) (0:30)
15. [Lecture: Strategic Technology Roadmaps and the S-Curve](#) (0:30)
16. [Lecture: Identifying, Monitoring, and Managing Emerging Technologies](#) (1:30)
17. [Case Discussion: Du Pont Kevlar and HTC Corporation](#) (1:00)
18. [Thread Intervention: Principles of Supportive Communication](#) (1:00)
19. [Guest Lecture](#) [Student Section June 7th Only] (1:00)
20. [Project: Enhancing Buying Power](#) – In Class Work Time (0:30)

Homework: Baidu.com - Valuation at IPO

Day 4 – Financial Acumen

21. [Lecture: Measuring and Analyzing Business and Investment Performance](#) (1:15)
22. [Lecture: Risk, Return, and the Time Value of Money](#) (1:00)
23. [Lecture: What Can You Learn about Your Current and Potential Contractors from Their Financial Statements?](#) (1:15)
24. [Case Discussion: Baidu.com - Valuation at IPO](#) (1:15)
25. [Thread Intervention: Leading Teams and Groups](#) (2:00 - 3:00)
26. [Project: Enhancing Buying Power](#) – In Class Work Time (0:30)

Homework: Something related to group project?

Day 5

27. [Group Project: Presentations](#) (2:00)
28. [Administrative-2: Feedback and Close](#) (0:30)

Syllabus Segment 0: Pre-Reading Set

Pre-readings will be assigned to each student. Students will be required both to read the materials and provide a brief written response prior to the course. The readings align with the three focus areas for the course (strategy, emerging technology, and financial acumen). Students will be asked to draw upon these readings during the course.

Readings

1. Strategy: Porter, M., "Forces that Shape Competitive Strategy" – This is a fairly standard text on competitive strategy, which includes discussion of industry structure.
2. Strategy: Collis & Runstad, "Can You Say What Your Strategy Is?" – This article focuses on helping management-level individuals learn how to create concise statements of strategy. This is a critical aspect to ensuring that people within an organization, project, or program both understand and buy into the strategy.
3. Emerging Technology: Evans, Ralston and Broderick, "Strategic Thinking About Disruptive Technology" – Discusses the differences between disruptive and incremental technology. It discusses the advantage to teams to examine roadmaps, analyze scenarios, etc.
4. Financial Acumen: *Valuation: Measuring and Managing the Value of Companies* (5th Edition), Chapter 2, "Fundamental Principles of Value Creation" – This reading will provide students with basic finance concepts and tools used in valuing firm performance and strategic alternatives.

Assignment

For each reading in the pre-work packet, instructors will assign an associated question. Students will be asked to provide a one-page response to each question and submit this to the instructor team prior to the course beginning. [As questions are developed, they should be added here.]

Objectives

- The primary objective of the pre-work is to introduce students to foundation concepts that will be the basis for in-class work.
- The secondary objective of the pre-work is to get the students to begin using analytical skills to examine these concepts (via the assignment).
- The tertiary objective of the pre-work is to give the instructor group a benchmark as to the current understanding and abilities of the students with regard to the course objectives.

N.B.: Ideally, students will be given 2-3 weeks to complete the pre-reading and assignments and the instructor team will have a week to review this information. This, however, is dependent upon the students being identified and accepted well in advance of the course start date. For the instructor pilot, the instructors will likely be asked short questions (different from the student questions) which will ask opinions on how well the

materials relate to the course goals/objectives. (I.E. – can you see how this reading is relevant given the course objectives?)

In addition to this, students will be asked to create a student profile and to participate in a multi-source feedback exercise.

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Syllabus Segment 1: Welcome and Course Overview

Time: 0.6 hour

Responsible: Val Gavito

Support: TBD

Speaker: Val Gavito

Materials: Slides

Readings: SYS 350B Course Description

Assignment:

Summary

Faculty and new students will introduce themselves to the class with a short description of their professional background and experience, current roles and responsibilities, and their individual 350B course expectations. In addition, students who have completed SYS 350A will provide feedback on any applications of the 350A learning as well suggested 350A enhancements as a result of their post-350A experience.

Objective

- Break the ice for new students.
- Conduct active feedback on the leadership learning applications of 350A graduates.
- Expand faculty and student awareness of collective experience and individual communication styles.
- Set a positive tone for open faculty-student and student-student 350B interactions.

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Syllabus Segment 2: SYS 350B Overview & Student Expectations

Time: 0.3 hour

Responsible: Val Gavito

Support: TBD

Speaker: Val Gavito

Materials: Slides

Readings:

Assignments:

Summary: This segment will provide an abridged overview of the SYS 350 architecture and a more detailed discussion of the SYS 350B syllabus lectures, case studies, group effectiveness segments, and the two dominant themes of 350B; Understanding how sellers conduct business operations with emphasis on Competitive Strategy, leveraging Technology, and the definitions and applications of selected Financial Tools as forms of measurement, reporting, and analysis.

Objectives:

- Illustrate how 350B expands the technical leadership aperture from building systems and products to that of leading a broader business or organization within which there are several systems, product, and/or service offerings.
- Provide the logic underpinning the selection of the three 350B focus areas and the desired learning objectives of each area.
- Present the 350B syllabus with emphasis on student interaction and the underlying project as the dominant learning processes for conducting the class.
- Gain student feedback on the 350B syllabus with respect to desired emphasis of selected segments, any syllabus gaps for which there are desired discussions, and any questions on 350 process or student expectations.

Syllabus Segment 3: Expanding Systems Technical Leadership to the Business Lens: Enhancing Buying Power

Time: 0.5 hour

Responsible: Val Gavito

Support: TBD

Speaker: Val Gavito

Materials: Slides

Readings:

Assignments:

Summary: This segment will provide for an interactive, introductory discussion of the DoD Buying Power initiative to include definitions, acquisition policy and process mandates, and implementation strategies from the perspective of Technical Leadership. Particular discussion emphasis includes what initiatives might reside within the span of control of a Technical Leader, how a Technical Leader might manifest the objectives of those initiatives within their operational domain to include their industrial partners, what additional initiatives might provide significant value-add to the objective of enhancing the buying power of technical leaders, and how one might measure progress or impact of the cited initiative on enhancing buying power.

Objectives:

- Stimulate technical leadership thinking with regard to implementing policy initiatives within the operational domains of acquisition.
- Conduct interactive discussions on the impact of the Buying Power Initiatives on the competitive strategies and technology development processes of the defense industrial base.

Syllabus Segment 4: Leading versus Managing: Transformational and Transactional Dimensions of Effective Leadership (Thread Intervention)

Time: 1.0 hour

Responsible: Pete Dominick

Support: TBD

Speaker: Pete Dominick

Materials: Slides, Sutton, R.I. (2010). True leaders are also managers. *HBR Blog Network*, August.

Summary

This introduction session will build upon the general definition of leadership introduced during the Systems lens, which stressed that leadership was the act of influencing. This session we will focus on specific ways of describing leadership behavior, actions and outcomes in terms of what it means to be transformational and transactional. Transactional leadership focuses on an exchange process by which the leader motivates the follower to comply with his or her requests and rules. It is a necessary but typically but not sufficient to drive high performance. Transformational leadership on the other hand motivates followers to perform beyond their expectations by making them aware of important task outcomes, inducing them to do more for the collective than themselves, and activating their higher-order needs.

Objectives

- Understand what it means to distinguish between the notions of leading and managing and how the two roles are in practice inter-related, when it comes to technical and business decisions
- Use distinctions between transformational and transactional leadership to examine specific aspects of leading and managing.
- Provide participants with an opportunity to describe and discuss what they most value about effective leadership

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Syllabus Segment 5: Rooster Clagett (Case Discussion)

Time: 0.5 hours

Responsible: Bill Guth

Support: Val Gavito and Ralph Giffin

Speaker: Bill Guth

Materials: Slides, Case Study “John ‘Rooster’ Clagett: Visual Training Solutions Group, Inc.” (UVA Darden Business Publishing pdf)

Summary

This case will introduce the students to the needs for competitive strategy decision making in business organizations. The case description of the situation facing Rooster Clagett and his young company Virtual Systems Training Group clearly indicates that Rooster has several majorly different alternative ways to grow his company in the future. Each alternative path to future growth for the company targets different markets, including procurement for the Department of Defense. In evaluating each of these alternatives, Rooster must consider who his competitors will be, and the resources he and his company have compared with what will be needed to make it possible to be successful in competing with them. He must determine the amount of value his company can create in each of these alternative paths compared with that created by his potential competitors. The case also makes it clear that Rooster has to consider how congruent each alternative path is with his own personal values and goals.

Objectives

- To introduce the participants to the need for competitive strategy analysis and formulation in business organizations
- To establish the management need for and potential usefulness of concepts, knowledge and tools helpful in analyzing competitive strategy issues and in formulating competitive strategies with high prospects for success in creating value
- To introduce the role of personal values and goals in business leadership

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Syllabus Segment 6: Enhancing Your Buying Power - Introduction (Project)

Time: 1.0 hour

Responsible: Ralph Giffin

Support: Val Gavito

Speaker: TBD

Materials: Slides

Readings: TBD

Assignment: Students will create a presentation to address the project.

Summary

Students will be asked to synthesize and reflect on what they have learned in 350B and demonstrate how this learning experience and newly gained knowledge might impact their ability to perform in their current positions. They will be asked to do this via a group exercise which will take place across the week with time at the end of each day devoted to reflect on the day's topics and identify ways in which what they have learned can be translated into outcomes which will enhance their technical buying power as government acquisition professionals. Finally, they will be asked to package and deliver their findings to at least two different constituent types (receivers) demonstrating their understanding and use of various supportive communication and influence principles introduced in this course.

Objectives

- Identify how 350B learning outcomes can be translated into enhanced on-the-job performance
- Demonstrate the ability to create clear and concise messaging and the ability to utilize various supportive communication and influence principles via a presentation to different constituent types (receivers)
- Demonstrate the ability to create a credible and impactful plan which gains buy-in from stakeholders

Supportive Communication Principles by Receiver type	Communicating to Peer	Communicating to Customer	Communicating to Team	Communicating to Senior Exec
Influence Tactics				
Interpersonal Style				
Attention Span				

Table 1 – Communication Intersections

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Syllabus Segment 7: The Concept of Competitive Strategy, Value Creation, Mission & Vision (Lecture)

Time: 1.25 hour

Responsible: Bill Guth

Support: TBD

Speaker: Bill Guth

Materials: Slides,

Summary

In competitive industries, firms must have one or more competitive advantages to enjoy above average financial returns. The objective of competitive strategy is to create competitive advantage(s). The more sustainable these advantages are, the greater their value to a firm over longer periods of time.

Current and potential competitors, however, are powerfully motivated to overcome the high performing firm's competitive advantage(s), thus capturing increased financial performance for themselves. This motivation encourages innovation in all of the activities of firms that create value, e.g., product conception and design, communication with customers, inbound logistics, production processes, outbound logistics, and distribution channels. Innovation by competitors is a major driver of the need for the managers of even very high performing firms to constantly monitor the effectiveness of their current competitive strategies, and to periodically modify, reorient, or restructure them. Macro changes in the political, social, economic and technological environment of industries and the firms in them also create new opportunities and challenges to firms, requiring constant monitoring, and periodic changing of their competitive strategies.

Competitive advantage is the result of creating a larger spread between the value to the customers of what is being sold and the cost of producing as compared with that of their competitors.

Vision and mission are business leadership tools useful in communicating internally and externally to the various stakeholders of the firm the level of performance being targeted by management, and the choices management has made about where the firm will attempt to create value and competitive advantage. Competitive strategy defines how the firm will create value and competitive advantage in that arena.

Objectives

- To develop the analytics of value creation
- To present the principles underlying the concept of competitive strategy
- To clarify the meaning of terms widely used in business practice in relation to firm performance
- To explore the value of understanding competitive strategy in relating to firms as buyers of their products and/or services.

- To explore the value of the concept of value creation in application to increasing buying power.

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Syllabus Segment 8: Industry Structure and Dynamics, Industry Segmentation, and Competitor Benchmarking (Lecture)

Time: 1.25 hours

Responsible: Bill Guth

Support: TBD

Speaker: Bill Guth

Materials: Slides

Summary

There are three major determinants of firm performance:

- The firm's macro environment (economy, technology, society, regulation, etc.)
- The firm's immediate industry environment (competition, rivalry, buyers, suppliers, etc.)
- The firm's resources, capabilities, and the actions of its decision makers.

Some analysts lump the factors in the last two of these determinants of firm performance into a general category called micro-economic variables. Several empirical studies have documented that these micro-economic variables account for as much as 80% of the variance in firm performance.

This session will develop concepts and tools useful in analyzing the impact of a firm's industry on the effectiveness of its competitive strategy, and concepts and tools useful in analyzing the types of resources a firm brings to its competitive strategy and their potential to sustain competitive advantage.

Objectives

- To help participants understand the pressures current and potential contractors are under from their industry structures and dynamics
- To provide participants with tools useful in understanding and predicting the financial performance of current and potential contractors.
- To encourage participants to consider the impact of their acquisition programs on the structure and dynamics of the defense industry in search of ways to increase their buying power.

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Syllabus Segment 9: Macro Environmental Analysis (Lecture)

Time: 1.00 hours

Responsible: Bill Guth

Support: TBD

Speaker: Bill Guth

Materials: Slides

Summary

A firm's macro-environment consists of factors in its surroundings that have the potential to affect its performance. The impact of macro-environmental factors is often general and indirect, requiring careful analysis to link to firm performance.

Macro-environmental factors include sociocultural, technological, political-legal, and economic variables. A firm considers these variables as part of its environmental scanning to better understand the threats and opportunities facing the firm and how strategic plans need to be adjusted, modified, reoriented, or restructured so the firm can obtain or retain competitive advantage.

The segment will develop a framework for macro-environmental analysis, and illustrate its application to a number of different firms' competitive strategies. The session will end with a discussion of the macro-environmental variables impacting the defense industry.

Objectives

- To introduce participants to macro-environmental analysis as a critical tool in the formulation of competitive strategy
- To illustrate the need for continuous monitoring of the macro-environment and its potential impact on the overall attractiveness of various industries.
- To encourage periodic discussion with colleagues of changes in the macro-environment surrounding defense procurement and the impact of these changes on their strategies for increasing buying power.

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Syllabus Segment 10: Discussion of Intel Corporation 1967-2002 and 2005 (Case Discussion)

Time: 0.5 hours

Responsible: Bill Guth

Support: TBD

Speaker: Bill Guth

Materials: Slides, “Intel Corporation: 1968-2003” and “Intel Corporation 2005” (Harvard Business School pdf)

Summary

These cases present the industry structure and dynamics of the microchip/microprocessor industry since the beginning of Intel with its invention of the microchip. Intel’s competitive strategy based on its microchip invention was seriously flawed when viewed from the perspective of the industry as a whole, and in 1979 management decided to stop producing them. Having learned from their mistakes in microchips, management developed a competitive strategy in microprocessors that has kept the company at the top of its industry since then. The case compels participants to consider the impact of the Internet on Intel’s competitive strategy looking forward.

Objectives

- To develop participant skills in applying industry structure and dynamics analysis to identify the vulnerabilities and strengths of various competitors
- To highlight the point that competitive strategy is more complex than simply inventing a better product
- To underscore the point that competitive strategy must consider the sustainability of competitive advantage as well as its initial creation

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Syllabus Segment 11: Influencing without Authority: Leaderless Group Discussion (Thread Intervention)

Time: 2.0 hours

Responsible: Pete Dominick

Support: TBD

Speaker: Pete Dominick

Materials: Slides, “Applying and Resisting Peer Influence” (MIT Sloan Management Review)

Summary

We will use a leaderless group discussion exercise (CTC Corporation) to provide participants with an opportunity learn more about their own approaches to influencing and collaborating with others. Working in small groups of 5-7, participants assume the roles of senior functional managers within a fictitious aerospace and defense corporation. Within those groups they will work toward a consensus decision on who to send to a leadership development program. The exercise is debriefed in terms of who and why people were able to influence the decision process. Key principles of interpersonal influence will be described and applied to what they experienced. The activity will require that each group have one program facilitator serve as an observer.

Objectives

- Understand and apply key principles of interpersonal influence in small group settings
- Provide participants with real time feedback on their own skills and approaches to influencing others and shaping team decision processes

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Syllabus Segment 12: Enhancing Your Buying Power - Continued (Project)

Time: 0.5 hours

Responsible: Ralph Giffin

Support: Val Gavito

Speaker: TBD

Materials: Slides

Readings: TBD

Assignment: Students will create a presentation to address the project.

Summary

Students will be asked to synthesize and reflect on what they have learned in 350B and demonstrate how this learning experience and newly gained knowledge might impact their ability to perform in their current positions. They will be asked to do this via a group exercise which will take place across the week with time at the end of each day devoted to reflect on the day's topics and identify ways in which what they have learned can be translated into outcomes which will enhance their buying power as government acquisition professionals. Finally, they will be asked to package and deliver their findings to at least two different constituent types (receivers) demonstrating their understanding and use of various supportive communication and influence principles introduced in this course.

Objectives

- Identify how 350B learning outcomes can be translated into enhanced on-the-job performance
- Demonstrate the ability to create clear and concise messaging and the ability to utilize various supportive communication and influence principles via a presentation to different constituent types (receivers)
- Demonstrate the ability to create a credible and impactful plan which gains buy-in from stakeholders

Supportive Communication Principles by Receiver type	Communicating to Peer	Communicating to Customer	Communicating to Team	Communicating to Senior Exec
Influence Tactics				
Interpersonal Style				
Attention Span				

Table 1 – Communication Intersections

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Syllabus Segment 13: Technology and Innovation Management (Lecture)

Time: 1.0 Hour

Responsible: W. Reinisch

Support: Val Gavito

Speaker: W. Reinisch

Materials: Slides

Readings: TBD

Summary: This section provides an introduction to management of technology and innovation. We will present and discuss techniques and business approaches for the technology investment process. We will also discuss the issues that businesses face in planning for technology and innovation.

Objectives:

- To develop an awareness of the range, scope, and complexity of the issues and problems related to strategic management of technology and innovation.
- Relate strategic management of technology and innovation to the system engineer.
- To develop an understanding of the “state-of-the-art” of strategic management of technology and innovation.
- Discuss management skills, methodologies and critical thinking in order to achieve a sustainable technological competitive advantage.
- We will review the technological basis of a firm, assessing the firm’s innovation capability, technology life cycles, development strategies, and core competencies. To provide some of the background and skills to develop or assess the technology strategy of an organization.
- We will review the importance of intellectual property in the organization. Discuss alternative intellectual property strategies, how companies view IP and the value it creates, and some of the processes they use.
- To review some of the tools and concepts used by companies that are working in technology intensive industries.
- To offer some practical framework for defining strategic management of technology and innovations.

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Syllabus Segment 14: Aligning a Technology Strategy to the Business Strategy (Lecture)

Time: 0.5 Hour

Responsible: W. Reinisch

Support: Val Gavito

Speaker: W. Reinisch

Materials: Slides

Readings: TBD

Summary: How the corporate strategy relates to the technology and innovation strategy. The firm's technology strategy relates directly to the technology competencies and capabilities. The technology strategy is shaped by the internal organization and the external factors.

Objectives:

- To review the basic skills necessary to assess or construct a technology strategy for a firm.
- To develop an understanding why a firm's technology strategy, business strategy and the needs of the customer must be aligned.
- Develop an understanding of why achieving technology-based competitive advantage can be part of firm's business strategy.
- Review the Porter Model.

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Syllabus Segment 15: Strategic Technology Roadmaps and the S-Curve (Lecture)

Time: 0.5 Hour

Responsible: W. Reinisch

Support: None

Speaker: W. Reinisch

Materials: Slides, Need Map Template

Readings: TBD

Summary: Description of the types and characteristics of technology and innovation projects and how they integrate with the technology assets of the firm. An Introduction to strategic road maps and the different types of business and technology projects. Use of technology road maps as a technology and business communication tool, including customers', technical, and business needs. The S-Curve and why it is a critical tool for understanding a technology-based strategy.

Objectives:

- To review needs and types of business and technology-based innovation projects.
- Review Strategic Technology Road maps, Product-Technology Roadmap, and Technology Needs Map Template.
- Review S-Curves.
- To develop an understanding why road maps and S-Curves are important tools for a technology-based firm, and how to use them to assess a technology and/or market.
- Understand how to use these tools to better understand the technology and status of the firm and/or market.

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Syllabus Segment 16: Identifying, Monitoring, and Managing Emerging Technologies (1:30)

Time: 1.5 Hours

Responsible: W. Reinisch

Support: Val Gavito

Speaker: W. Reinisch

Materials: Slides

Readings: TBD

Summary: Effective systems engineering technical leaders have the ability to “see around corners.” They know before others when technology trends are shifting, evolving, being disturbed and/or becoming obsolete. They’re also able to understand and react quickly and successfully to how these technologies can impact their business solutions and affect the supply chain. This segment introduces the “Emerging Technology” Focus area to support systems engineering leaders and promotes their understanding of how the industry professionals utilize a combination of strategies and develop emerging and sustaining enabling technology to support their business strategy and objectives. In addition, this segment will focus on initial understanding of the tools that can be utilized in identifying, monitoring and managing emerging technologies.

Objectives:

- Discuss and define emerging and disruptive technology – Review the Management Changes of Emerging Technologies and why they are different. Enhance and develop knowledge in the management of emerging technologies. Provide some relationship to how commercial technology can be utilized in existing or future DoD systems and the challenges.
- We will address why the management of emerging technologies is different from more mature technologies, including issues for incumbents, established and Startup companies. Review market opportunities and “technology push” vs. “market pull” relationships in this field.
- We will discuss the management challenges posed by emerging technologies at the point where scientific research reveals a technological possibility and follow this all the way to commercialization of the technology into lead markets.
- We will address how to understand, assess, and evaluate some of the organization challenges facing companies dealing with emerging technologies. This will include discussion of the identification and evolution of emerging technologies. (Optional: If Time available: Discuss perspectives on emerging technologies, future customer trends, and forecasting methodologies including scenario planning/construction and the accuracy of past technology forecasts.)
- This section will attempt to bring an element of rigor to a relatively new and constantly evolving field of management.
- Discuss ways in which to build technology investment roadmaps that align with business growth strategies, provide for continuous assessment of technology

maturity, provide comparative assessments of competitor positions, illustrate applicability to market demands, and support optimal investment decision points.

- A short group exercise will be utilized. Teams will develop a list of emerging technologies from the perspective of the student's domain.

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Syllabus Segment 17: Du Pont Kevlar and HTC Corporation in 2009 (Case Discussion)

Time: 1.0 Hour

Responsible: W. Reinisch

Support: TBD

Speaker: W. Reinisch and Class

Materials: TBD

Readings: Du Pont Kevlar Aramid Industrial Fiber (Abridged), HBS Case Study Document and HTC Corp. in 2009, HBR Case Study Document

Summary: We will use the Case Study Method to reinforce and see practical applications of the foundation elements of the emerging technology segments of this course. This will be accomplished through an interactive discussion facilitated by the instructor of the Du Pont and the HTC cases.

Objectives:

- Students will be expected to have read the case documents and prepare before class.
- The facilitator will be asking questions of the class and to participate in the group discussion. The students will be expected to quickly analyze and concisely communicate the technology assessments of the case.

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Syllabus Segment 18: Principles of Supportive Communication (Thread Intervention)

Time: 1.0 hours

Responsible: Pete Dominick

Support: TBD

Speaker: Pete Dominick

Materials: Slides, Jodi Hollins Role Play; other reading TBD

Summary

This module would focus on key principles of interpersonal communication and coaching others. Participants will be introduced to eight principles of supportive communication, principles of coaching, to develop talent. They will practice applying them within the context of a role-play that requires them to coach and provide feedback to a direct report who while technically very capable lacks struggles to work collaboratively in a team environment. The role play will afford participants the opportunity to provide and receive feedback about key communication behaviors that impact team process and interpersonal effectiveness.

Objectives

- Understand and apply key principles of supportive communication and coaching
- Provide participants with real time feedback on their own skills and approaches to using supportive communication and basic coaching skills to understand performance problems and to help others establish plans for improving

Griskevicius, V. Cialdini, R.B, Goldstein, N.J, (2008). Applying and Resisting peer influence, *MIT Sloan Management Review* 49(2). 84-88.

ALTERNATIVE OPTION for Segment 18

Personal Style and Interpersonal Communication (Thread Intervention)

Time: 2.0 hours

Responsible: Pete Dominick

Support: TBD

Speaker: Pete Dominick

Materials: Slides, DISC workbooks.

Summary

One widely accepted concept for acknowledging the four basic temperaments or communication styles is known as the DISC method. The DISC is easy to understand, learn, remember, and apply. The **D** stands for the **Driving** style and is a measure of how people

respond to problems and challenges. The **I** stands for the **Influential** style and is a measure of how people influence others to their point of view. The **S** stands for the **Steady/Stable** style and is a measure of the intensity levels of a person's behavior toward the pace of the environment. The **C** stands for **Compliance** and is a measure how people respond to rules and procedures set by others and their need for information.

This session would focus on helping participants understand the role that interpersonal style plays in effective communication and collaboration. Participants would each complete the Personal Profile System Inventory (DISC model) in order to a) learn more about their own interpersonal style b) develop a deeper appreciation for how to communicate and work with others whose styles are different from their own.

Objectives

- Learn how to describe interpersonal style and communication in terms of four broad categories that comprise the DISC model
- Help participants' develop a deeper appreciation for their own interpersonal style – their strengths and areas for development
- Improve participants' capacity communicate with and influence others whose style and approach is different from their own.

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Syllabus Segment 19: Guest Lecture (Lecture)
NOTE: For Student Pilot (June 7th, 2012) Only

Time: 1.0 Hour

Responsible: W. Reinisch

Support: W. Reinisch

Speaker: Dr. H. Lee Buchanan, Venture Partner at Paladin Capital Group, and Former Assistant Secretary of the Navy (Research, Development, and Acquisitions)

Materials: TBD

Readings: None

Summary: A special guest lecturer will come and share his views and experiences of both government and commercial technology acquisitions. He will also review some new models that are developing. This talk will cover the following areas:

Government and commercial business models are vastly different. Very often they are completely incompatible. As a result the number of defense contractors doing business commercially and vice versa is very rare. As a result the DoD can be denied many of the most advanced technologies that are readily available in the commercial sector. He will discuss some of the biggest areas of disparity and point to some ways of overcoming the barriers.

Objectives:

- To provide real work and outside views of the state of the art practices in the field.
- To provide current and actual examples from both the industry and government sectors.

Biography:

Dr. Lee Buchanan is currently Venture Partner, Paladin Capital Group in Washington, DC. He is also a Director of Tektronix, Lucent-Alcatel Government Solutions, TestMart, Corp., Advantage Federal Corp, and the Robotics Technology Consortium.

Prior to Paladin Dr. Buchanan was Vice President, Advanced Concepts, EDO Corporation, a \$1B producer of Intelligence, Electronic Warfare, sonar, and weapons systems for the U.S. military; Executive Vice President of Perceptis, a holding company for producers of wireless data collection and intelligence systems; and President and CEO of QualStream.

Dr. Buchanan has also had a significant career with the U.S. Government serving as Assistant Secretary of the Navy (Research, Development, and Acquisition), the most senior executive for research, development, and acquisition for the U.S. Navy and the U.S. Marine Corps; Deputy Director and Acting Director of the Defense Advanced Research Projects Agency; Division Manager for Titan Corporation; Senior Research Physicist at the Lawrence Livermore National Laboratory; and Naval Aviator.

He has B.S. and M.S. Degrees in Electrical Engineering from Vanderbilt University and a Ph.D. in Applied Physics from University of California.

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Syllabus Segment 20: Enhancing Your Buying Power - Continued (Project)

Time: 0.5 hours

Responsible: Ralph Giffin

Support: Val Gavito

Speaker: TBD

Materials: Slides

Readings: TBD

Assignment: Students will create a presentation to address the project.

Summary

Students will be asked to synthesize and reflect on what they have learned in 350B and demonstrate how this learning experience and newly gained knowledge might impact their ability to perform in their current positions. They will be asked to do this via a group exercise which will take place across the week with time at the end of each day devoted to reflect on the day's topics and identify ways in which what they have learned can be translated into outcomes which will enhance their buying power as government acquisition professionals. Finally, they will be asked to package and deliver their findings to at least two different constituent types (receivers) demonstrating their understanding and use of various supportive communication and influence principles introduced in this course.

Objectives

- Identify how 350B learning outcomes can be translated into enhanced on-the-job performance
- Demonstrate the ability to create clear and concise messaging and the ability to utilize various supportive communication and influence principles via a presentation to different constituent types (receivers)
- Demonstrate the ability to create a credible and impactful plan which gains buy-in from stakeholders

Supportive Communication Principles by Receiver type	Communicating to Peer	Communicating to Customer	Communicating to Team	Communicating to Senior Exec
Influence Tactics				
Interpersonal Style				
Attention Span				

Table 1 – Communication Intersections

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Syllabus Segment 21: Measuring and Analyzing Business and Investment Performance (Lecturing)

Time: 1.25 hours

Responsible: Bill Guth

Support: TBD

Speaker: Bill Guth

Materials: Slides

Summary

Firms create value by investing capital to generate future cash flows at rates of return that exceed their cost of capital. The faster they can grow and deploy more capital at rates of return that exceed the cost of that capital, the more the value they create. The mix of growth and return on invested capital relative to the cost of capital is what drives the creation of value. Any action that doesn't increase cash flows doesn't create value.

This session will develop these fundamental principles of corporate finance, including the math needed to analyze them. In addition, it will discuss why many widely adopted corporate actions actually destroy rather than create value.

Objectives

- To develop participants' capabilities at analyzing the impact of various firm commitments and actions on the value created by the firm
- To provide participants with analytic tools useful in understanding a firm's historical financial performance, and in forecasting its financial performance in the future.

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Syllabus Segment 22: Risk, Return, and the Time Value of Money (Lecture)

Time: 1.0 hour

Responsible: Bill Guth

Support: TBD

Speaker: Bill Guth

Materials: Slides,

Summary

This session will develop additional concepts and tools useful in evaluating alternative investments managers are considering as part of their competitive strategies. These concepts and tools provide rigorous analysis of the relationships between risk, return, and the timing of cash flows associated with different investment alternatives. The three most widely used valuation methods – discounted cash flow valuation model, economic profit valuation model, and comparable multiple valuation model – will be developed and critically evaluated.

Objectives

- To develop participants' understanding of the financial implications of the investment decisions of current and prospective contractors
- To develop participants' capabilities in understanding the financial arguments of current and potential contractors against initiatives proposed by you as the buyer, and to determine which if any of these arguments are BS, or at least are based on flawed analytics.

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Syllabus Segment 23: What Can You Learn about Your Current and Potential Contractors from Their Financial Statements? (Lecture)

Time: 1.25 hours

Responsible: Bill Guth

Support:

Speaker: Bill Guth

Materials: Slides

Summary

This session will look at the financial statements of representative firms in the major categories of firms competing in the defense industry, utilizing the concepts and tools developed in the previous two segments. The key questions we will try to answer are: 1) how well is each of the selected firms performing financially? 2) What are the Implications of each firm's financial performance historically, and projected financial performance for your current or potential buying relationship with them?

Objectives

- To develop participants' capabilities at analyzing regularly published financial statements of current and potential contractors, and using those analyses to forecast potential further performance
- To provide concepts and tools useful in forecasting future financial performance of current and potential contractors, and to analyzing the impact of alternative buying approaches on future performance

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Syllabus Segment 24: Baidu.com - Valuation at IPO (Case Discussion)

Time: 1.25 hours

Responsible: Bill Guth

Support: TBD

Speaker: Bill Guth

Materials: Slides, "Baidu.com, Inc.: Valuation at IPO" (Stanford Graduate School of Business pdf)

Summary

Since its launch in January of 2000, Baidu.com Inc. quickly grew to become the leading Internet search provider in China, offering a unique Chinese language search platform and other online community-based products to the Internet users and customers in China. Baidu registered to go public on the NASDAQ in August 2005. The initial public offering (IPO) turned out to be one of the highest-profile debuts since the Internet bubble burst in 2000. The stock price jumped 354 percent on the first day of trading and closed at \$122.54, valuing the company at about \$3.96 billion based on 32.3 million shares outstanding.

While the market showed strong enthusiasm for the stock, Baidu's public offering generated much debate about the underlying value of the firm. Many argued that the price could not be justified by the underlying values of the firm. Others argued that the company would not be able to sustain the growth investors implicitly were expecting after the IPO.

This session apply the various approaches to valuation developed in the previous two sessions to the company's stock to evaluate its price, emphasizing the linkage between the robustness of the company's competitive strategy in relation to the future potential of the firm to generate growth in cash flows.

Objectives

- To develop participants skills at applying valuation concepts and tools
- To highlight the challenges of evaluating competitive strategies of young companies in emerging industries
- To enhance the ease with which participants will be able to distinguish between marketing hype, general market madness, and the real potential of firms to create value

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Syllabus Segment 25: Leading Teams and Groups (Thread Intervention)

Time: 2-3 hours

Responsible: Pete Dominick

Support: TBD

Speaker: Pete Dominick

Materials: Slides, Possibly - Polzer (2004). *Army Crew Team Case*, Harvard Business School Publishing.

Summary

This module will include lecture, as well whole class and small group discussions to introduce participants to fundamental models for understanding, diagnosing and improving team health and dynamics. The key models we'll explore are the Inclusion, Control and Affection, framework (Bennis & Shepard), the Five dysfunctions model (Lencioni) and the core concerns framework (Fischer & Shapiro). We will explore these models in relation to a case example and through having participants apply these concepts to the teams they lead and work on.

Objectives

- Become familiar with different models for diagnosing and improving team health and dynamics
- Understand the important role that conflict plays in team functioning and become familiar with one framework (the emotional concerns framework) for leveraging it.
- Use a team process model to describe strengths and improvement areas for teams they lead or are a part of

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Syllabus Segment 26: Enhancing Your Buying Power - Continued (Project)

Time: 0.5 hours

Responsible: Ralph Giffin

Support: Val Gavito

Speaker: TBD

Materials: Slides

Readings: TBD

Assignment: Students will create a presentation to address the project.

Summary

Students will be asked to synthesize and reflect on what they have learned in 350B and demonstrate how this learning experience and newly gained knowledge might impact their ability to perform in their current positions. They will be asked to do this via a group exercise which will take place across the week with time at the end of each day devoted to reflect on the day's topics and identify ways in which what they have learned can be translated into outcomes which will enhance their buying power as government acquisition professionals. Finally, they will be asked to package and deliver their findings to at least two different constituent types (receivers) demonstrating their understanding and use of various supportive communication and influence principles introduced in this course.

Objectives

- Identify how 350B learning outcomes can be translated into enhanced on-the-job performance
- Demonstrate the ability to create clear and concise messaging and the ability to utilize various supportive communication and influence principles via a presentation to different constituent types (receivers)
- Demonstrate the ability to create a credible and impactful plan which gains buy-in from stakeholders

Supportive Communication Principles by Receiver type	Communicating to Peer	Communicating to Customer	Communicating to Team	Communicating to Senior Exec
Influence Tactics				
Interpersonal Style				
Attention Span				

Table 1 – Communication Intersections

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Syllabus Segment 27: Presentations (Group Project)

Time: 2 hours

Responsible: TBD

Support: TBD

Speaker: TBD

Summary

Students will be asked to synthesize and reflect on what they have learned in 350B and demonstrate how this learning experience and newly gained knowledge might impact their ability to perform in their current positions. They will be asked to do this via a group exercise which will take place across the week with time at the end of each day devoted to reflect on the day's topics and identify ways in which what they have learned can be translated into outcomes which will enhance their buying power as government acquisition professionals. Finally, they will be asked to package and deliver their findings to at least two different constituent types (receivers) demonstrating their understanding and use of various supportive communication and influence principles introduced in this course.

Objectives

- Identify how 350B learning outcomes can be translated into enhanced on-the-job performance
- Demonstrate the ability to create clear and concise messaging and the ability to utilize various supportive communication and influence principles via a presentation to different constituent types (receivers)
- Demonstrate the ability to create a credible and impactful plan which gains buy-in from stakeholders

Supportive Communication Principles by Receiver type	Communicating to Peer	Communicating to Customer	Communicating to Team	Communicating to Senior Exec
Influence Tactics				
Interpersonal Style				
Attention Span				

Table 1 – Communication Intersections

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Syllabus Segment 28: Feedback and Close (administrative)

Time: 1.5 hours

Responsible: Hutchison

Support: Gavito

Presenter: Hutchison

Materials: Course Evaluation form; Instructor Project Assessment form

Readings: N/A

Assignment: N/A

Summary

The students will be asked to provide feedback on the course, including on the general content, the applicability of content to acquisition, and their (perceived) ability to apply the methods, techniques, and principles learned in their current organizational roles.

Students will be asked to perform individual assessments as well as complete a group exercise to identify the key feedback from the group.

In addition, the instructors will provide feedback on the group projects to the students.

Objectives

- Provide students' with feedback on their performance (as a group)
- Collect student impressions of the course (benefits, areas for improvement).

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APPENDIX F: SYS350C STORYBOARDS

SYS350C: Systems Engineering Technical Leadership Enterprise Lens

Modules

0. Pre-readings: [Explanation of Pre-Reading Set](#)

Day 1

1. [Welcome & Course Overview](#)
2. [The Technical Enterprise – Descriptions & Interactions](#)
3. [Understanding Your Enterprise & That of Your Stakeholders](#)
4. [SYS350B Group Project Overview: Enhancing Buying Power](#)

Day 2 – Theme?

5. [Creating Value in the Multi-Business Enterprise](#)
6. [Capturing Value in the Multi-Business Enterprise](#)
7. [Enterprise Engineering, Technology, and Process](#)
8. [Building Readiness for Enterprise Change](#)
9. [Group Project](#)

Day 3 – Theme?

10. [Enterprise Engineering, Technology, & Process II](#)
11. [Technology Acquisition for the Enterprise](#)
12. [Enterprise Leverage of Engineering & Technology](#)
13. [Tools for Leading Enterprise Change](#)
14. [Group Project](#)

Day 4 – Theme?

15. [The Senior Technical Leader: Leading at the Enterprise Level](#)
16. [The Senior Technical Leader: Effectively Communicating at 360°](#)
17. [Leading Enterprise Professional Development](#)
18. [You as an Enterprise Change Agent](#)
19. [Group Project](#)

Day 5

20. [Student Presentations](#)
21. [Feedback](#)

Explanation of Pre-Reading Set

Time: N/A

Responsible: Hutchison

Support: Gavito, Burke, Guth, Reinisch, Giffin

Presenter: N/A

Materials: See below

Readings: N/A

Assignment: N/A

Reading 1

Summary/Uses

Reading 2

Summary/Uses

Reading 3

Summary/Uses

Reading 4

Summary/Uses

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Syllabus Module M-1.0: **Welcome & Course Overview (lecture)****Time:** 0.75 hours**Responsible:** Gavito**Support:** Hutchison, Burke, Guth, Reinisch, Giffin**Presenter:** Gavito**Materials:** Slides**Readings:** N/A**Assignment:** N/A**Summary**

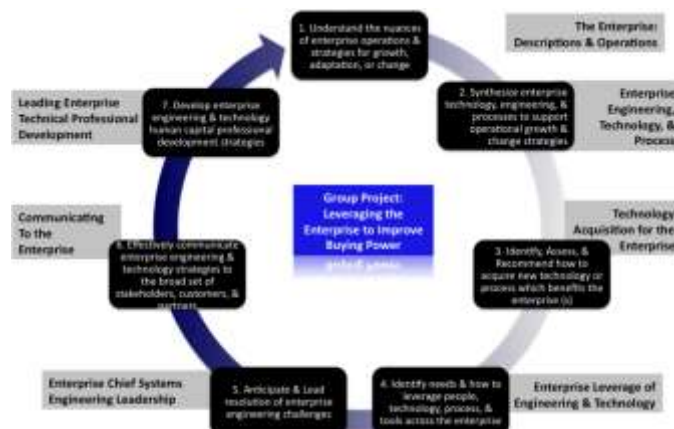
- This segment will initially introduce the Students and faculty and then the students will be asked to briefly describe any leadership action or initiative they performed which was influenced by SYS 350A or 350B. The segment will continue with a review of the SYS 350 three-lens architectural approach, the complementary relationships of 350C with 350A and 350B, and an overview of 350C course objectives, focus areas, and syllabus.

Objective

- The objective of this segment is to provide a clear understanding of the 350C objectives and syllabus plan, adjust or tailor the syllabus plan as appropriate to setup 350C learning, and show how the focus areas support an extension to student's technical buying power leadership portfolio.

**Support to Course Objectives**

- This module will describe the course objectives and focus areas.

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Syllabus Module M-2.0: The Technical Enterprise – Descriptions & Interactions

Time: 0.75 hours

Responsible: Gavito

Support: Hutchison, Burke

Presenter: Gavito

Materials: Enterprise Questionnaire Handout after the lecture

Readings: N/A

Assignment: N/A

Summary

- This module will frame Enterprises in terms of definition, form, characteristics, and dynamics to baseline the student's mental and physical models of their own Enterprise for subsequent 350C learning. Key learning points include:
 - Present, discuss, and agree to a working definition of an Enterprise.
 - Discuss how Enterprises are formed a) by design, b) by collaborative adaptation, and c) by known or unknown consequence.
 - Discuss two types of Enterprises a) Enterprises as structured systems comprised of organizational nodes, connections, inputs, outputs and b) Enterprises as activity based systems.
 - Discuss the characterization of Enterprises from a) 'Inside-Out' starting with you as a technical leader then expanding out to your sphere of accountability and responsibility and b) 'Outside-In' starting with the Enterprise elements in your sphere of accountability and responsibility then progressing in towards you as a technical leader.
 - Present and discuss three Enterprise examples to include a) an (Industry Structure) Aerospace and Defense company, b) a (Government Structure) DoD Agency or technology related Command, and c) a (Technical Development Activity) Research and Development project.
- The module will conclude with students constructing their respective structural Enterprise model to be used for expanded leadership 'thread' and 350C focus area learning.

Objective

- The objectives of this segment are to a) expand the student's perspective of the broad sets of Enterprises to support convergence to a model of their own Enterprise, b) apply the learning to construct a working model of their own Enterprise, and c) initiate student thinking of the dynamic forms of their Enterprise to support their Group Project activities and subsequent 350C learning.

Support to Course Objectives

- This module will provide a basis of Enterprise definition and dynamics to support learning objectives of the lectures and exercises within the Enterprise Description and Operations, Enterprise Leverage of Engineering and Technology,

Enterprise Chief Engineer, and communicating to the Enterprise focus areas and the Group Project activities. Additionally, this module will provide the student with an Enterprise model to further examine the behavioral aspects of Enterprises for the purpose of adaptation and change.

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**Syllabus Segment M-3.0: Understanding Your Enterprise & That of Your Stakeholders
(Interactive Lecture, Group Activities)**

Time: 2.5 hours

Responsible: Pamela Burke, PhD

Support:

Presenter: Pamela Burke, PhD

Materials: slides, PDFs, video of Dr. Hans Trompenaars -- Model of Corporate Cultures, Video of Dr. David Logan -- TEDX talk on Tribal Leadership

Readings:

1. Stop Blaming your Culture. Jon Katzenbach and Ashley Harshak. Strategy+Business, Booz & Co., Spring 2011, Issue 62, pp. 35-43. Reprint # 11108 <http://www.strategy-business.com/article/11108>
2. Why Culture is Key: The Global Innovation 100. Strategy+Business, Booz & Co., Winter 2011, Issue 65, pp. 31-45. Reprint # 11404 <http://www.strategy-business.com/article/11404>

Assignment: None

Summary

This segment introduces the value of identifying the major functional groups within an enterprise and their key stakeholders in order to build relationships, influence change, and overcome obstacles across boundaries and organizational cultures. Students create an enterprise map showing how the groups in their organization interact with key stakeholders. They then select a stakeholder who they perceive as having a very different organizational culture from their home organization and develop strategies for 1) better understanding the stakeholder's culture, and 2) Identifying key differences that a leader needs to address in order to communicate effectively across these organizational cultures. Interactive mini-lectures include information on assessing organization cultures, research on four general types of organizational cultures, and the role of leaders in being translators/ influencers across organization cultures, and the value of advancing collaborative webs.

This segment sets up the remaining "thread" topics where we go deeper into what leaders do to influence change in an organization and how they build the capacity for change and cross- organization collaboration and communication into the culture.

Group Activities:

1. Enterprise organizational map and stakeholders - collaborative webs
2. Assessing a culture -- anthropology walk
3. Beliefs and assumptions about our own culture -- class agree-disagree continuum
4. Cracking the culture code of a key stakeholder -- interview design

Objectives

- Understand the "big picture" of the groups that make up an enterprise and why it is important to examine the cultures of different stakeholders in order to be strategic about relationships, influence, and collaboration.

Support to Course Objectives

- The Enterprise: Understand the nuances of enterprise operations & strategies for growth, adaptation, or change
- Enterprise Communication: Effectively communicate enterprise engineering & technology strategies to the broad set of stakeholders, customers, & partners

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Syllabus Module M-4.0: **SYS350B Group Project Overview: Enhancing Buying Power**

Time: 1.0 hours

Responsible: Gavito

Support: Hutchison, Burke

Presenter: Gavito

Materials: Handouts

Readings: N/A

Assignment: Daily assignments will be distributed via handouts.

Summary

- This module will provide an overview of 350C Group Project.

Objectives

- Prepare the students for leveraging the 350C learning to support develop and present a recommended Enterprise Buying Power Initiative.
- The operational concept for the project consists of daily group activities facilitated by a set of questions and assignments to stimulate Enterprise level leadership learning. Days 1 through 3 (Monday through Wed) activities focus on Enterprise Definitions, initiative assessments, and preparing the Enterprise for change. Day 4 (Thursday) is dedicated to buying power initiative finalization and development of the group presentation. Group Presentations will then be conducted on Day 5 (Friday)
- The daily discussions and assignments are noted below.

Day 1: Defining the Enterprise (60 min)

1. Discuss the range and domain of an Enterprise in terms of what makes the best framework for enhancing technical buying power. Think of range as the horizontal and vertical Enterprise 'extensions'. Think of domain as the 'spheres of activity' for an Enterprise.
2. Draw a system representation of your selected Enterprise that reflects the predominant or primary organizational entities and activities of your enterprise.
3. Using your enterprise representation, identify the spheres of direct control and influence and any associated spheres of indirect control and influence which are resident if you had to bring about a cross-entity or cross-enterprise change required to enhance your buying power.

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Syllabus Module T-1.0: **Creating Value in the Multi-Business Enterprise (lecture)**

Time: 1.5 hours

Responsible: Guth

Support: Gavito, Giffin

Presenter: Guth

Materials:

Readings: N/A

Assignment: N/A

Summary

Many firms compete in more than one industry/business. In their drive for increasing shareholder value, managers of firms often believe that broadening the product/market scope of the firm will provide them with greater opportunity to grow earnings (free cash flow), and increase return on invested capital than would be provided by staying within the boundaries of their current businesses. In addition, business managers believe that investing in a broader rather than narrower range of businesses can – but doesn't necessarily – "smooth" earnings by diversifying the industry structure and business cycle risks they face in the firm's current businesses.

Historically, the principal means of expanding the product/market scope of a firm have been by merging with other firms, or by acquiring other firms. Either way, the firm expanding its product market scope must invest in the assets of the firms it merges with or acquires. In the case of firms to be merged or acquired that are publically held, the financial markets have valued the assets of the firms to be assimilated, reflecting that value in the price of their common stock. Rarely if ever will a firm be able to expand its product/market scope by merger or acquisition of assets at a price less than what the market has set, and most often, will have to pay a premium over that market price to obtain shareholder acceptance, and to win against other potential bidders.

Thus, for the firm striving to create value for shareholders by expanding its product/market scope, it must be able to increase the free cash flows and/or ROIC obtainable from the assets it merges with or acquires above what the market currently projects they will be, based on historical performance and evaluation of the competitive strategy determining their deployment. In other words, the assets being merged with or acquired **MUST** be more valuable being part of the larger firm than they were on their own – **AND**, more valuable than they would be if they had been merged with or acquired by yet another firm.

Multi-business enterprise strategy defines where how value will be created by the firm in expanding its product/market scope. In addition, it defines how that value will be captured by the firm's organization structure, processes, systems and culture.

Objectives

- To develop the analytics of value creation in a multi-business enterprise
- To understand why we have multi-business corporations, and what the limits are on their value-creating expansion
- To critically examine why a very high proportion (70-85%) of mergers and acquisitions destroy rather than create value
- To explore the value of understanding multi-business enterprise strategy in relating to firms as buyers of their products and/or services

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Syllabus Module T-2.0: Capturing Value in the Multi-Business Enterprise**Time:** 1.0 hour**Responsible:** Guth**Support:** Gavito, Giffin**Presenter:** Guth**Materials:****Readings:** N/A**Assignment:** N/A**Summary**

In order to capture the potential value created by expanding the product/market scope of the firm, the firm's management must design an organization structure, a set of management processes and systems, and shape an organizational culture that encourages and supports internal leveraging and sharing of resources. The foundational organizational building block of the multi-business enterprise is the "strategic business unit (SBU)" These "strategic business units" are given profit and loss responsibility, and are typically managed by a managing director, and a staff of functional specialists in the fields of marketing, operations, finance, and research and development. Major issues to be addressed and decided upon are: 1) how autonomous should the SBU's be?, 2) which of the functions should be centralized in the home office, versus being performed in the SBU?, 3) what coordinating mechanisms (e.g., committees, meetings, etc.) should be used to foster leveraging and sharing of resources across SBU's, 4) how can the firm encourage the crossing of organizational boundaries to leverage and share resources.

This segment will analyze the consequences of alternative choices managers might make in addressing these major issues. The session will end with a discussion of the organizational requirements to be effective in managing the technical resources of the firm, under different multi-business enterprise strategies.

Objectives

- To analyze the governance requirements for effective multi-business enterprise strategies.
- To introduce the concepts of organization structure, processes, systems and culture
- To analyze the major governance choices facing managers of multi-business enterprises
- To discuss how understanding the governance requirements for effective multi-business enterprise strategies can enhance the buying power of those

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Syllabus Module T-2.1: Discussion of Danaher Corporation Case**Time:** 0.75 hours**Responsible:** Guth**Support:** Gavito and Giffin**Discussion Leader:** Guth**Materials:** Danaher Case Study**Readings:** N/A**Assignment:** N/A**Summary**

This case presents the formulation and development of the multi-business enterprise strategy of Danaher Corporation from 1985 to 2010. It is classified by many analysts as a “conglomerate corporate strategy.” This is a strategy that requires minimal linkages between strategic business units. In general, this type of multi-business enterprise strategy has a dismal record of performance in the many companies that have adopted it in the US, particularly in the 1970’s and 1980’s. Yet, Danaher’s management has thus far achieved outstanding performance with its strategy. The case compels participants to search carefully for how Danaher both creates value and captures it in its acquisitions. In addition, it raises important questions about the limits of firm growth through expansion of its product/market scope.

Discussion Questions

1. How does Danaher add value to the businesses in its portfolio?
2. How important to its corporate advantage is the Danaher Business System (DBS)?
3. What exactly is the DBS? What type of resource is it? Is it a technology? Can it be imitated? Do you agree with Larry Culp that “the real value of Danaher lies in the accumulated experience of operating with DBS.....no one else has 20 years of experience with our system”?
4. From 1992 to 2006, Danaher achieved “compound annual organic growth of 5%, and total growth of 18%.” (p. 13). If it maintains that rate of growth, what will be its net profit in 2015? How much of that profit would come from acquisitions in 2015? What is your estimate of how much Danaher would have to invest in acquisitions in 2015?
5. Can Danaher achieve 5% organic growth indefinitely?
6. Larry Culp does not appear worried about competition from private equity firms in making acquisitions (p. 14). Do you agree with the analysis leading to his conclusion not to worry?

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Syllabus Module T-3.0: **Enterprise Engineering, Technology, and Process (lecture)**

Time: 1.25 Hours

Responsible: William Reinisch

Support: None

Presenter: William Reinisch

Materials: Slides

Readings: TBD

Assignment: None

Summary

This section provides an introduction to the engineering, technology and the processes used to manage technical organizations. We will present and discuss technology and business approaches for the enterprise. We will also discuss the issues that businesses face in planning and managing technical organizations at an enterprise level.

Objective

- To develop an awareness of the range, scope, and complexity of the issues and problems that an enterprise faces in the management of technology.
- Relate strategic management of technology and engineering to the overall enterprise for the system engineer.
- To develop a basic understanding of the management tools and processes that can be used to manage technology at an enterprise level.
- Discuss the skills and techniques and processes that an enterprise can utilize to gain a competitive advantage for the overall organization.
- We will discuss the intra and inter enterprise components of an enterprise technology strategy.
- To review some of the tools and concepts used by enterprises that are working in technology intensive industries.
- To offer some practical framework for defining strategic management of technology at an enterprise level.

Support to Course Objectives

- Synthesize engineering and technology needs and investment strategies, objectives, and plans to support growth, adaptation, or change objectives.

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Syllabus Module T-4.0: **Building Readiness for Enterprise Change (Interactive Lecture, Group Activities, Self-Reflection Inventory)**

Time: 2.0 hours

Responsible: Pamela Burke, PhD

Support:

Presenter: Pamela Burke, PhD

Materials: slides, PDFs, Change Reaction Inventory

Readings: None

Assignment: Complete the Change Reaction Inventory

Summary

Leading organization change is a strategic necessity and a human process. This segment encourages students to identify current and potential sources of planned and unplanned change that affect their enterprise and the enterprise of a key stakeholder. Students use the William Bridges model of transitions to reflect on their personal reactions to a recent organizational or personal change. In groups, students select a change that is underway in their enterprise and use the Change Reaction Inventory to identify possible reactions and leader actions that could accelerate positive change. Interactive lecture segments include models of planned and unplanned change, the Bridges model of transitions, and organizational approaches to building resilience and diminishing resistance to change.

Group Activities:

1. What's changing? exercise
2. Personal reactions to change exercise
3. The *Change Reaction Inventory* - personal preferences and patterns in your culture

Objectives

- Practice identifying internal and external changes that may affect the enterprise and its stakeholders so that a planned approach to building support for a change is possible
- Become more aware of your own reactions to change and how your reactions affect the people you lead
- Be able to discuss the basics of organizational change with teams and stakeholders so that you can jointly create and support important, sometimes difficult changes

Support to Course Objectives

- Professional Development leader: Develop enterprise engineering & technology human capital professional development strategies
- Enterprise Leverage: Identify needs and how to leverage people, technology, process, and tools across the enterprise
- The Enterprise: Understand the nuances of enterprise operations & strategies for growth, adaptation, or change

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Syllabus Module T-5.0: **Group Project**

Time: 1.0 hours

Responsible: Gavito

Support: Hutchison, Burke

Presenter: Gavito

Materials: Handouts

Readings: N/A

Assignment: Daily assignments will be distributed via handouts.

Summary

- This module will provide an overview of 350C Group Project.

Objectives

- Prepare the students for leveraging the 350C learning to support develop and present a recommended Enterprise Buying Power Initiative.
- The operational concept for the project consists of daily group activities facilitated by a set of questions and assignments to stimulate Enterprise level leadership learning. Days 1 through 3 (Monday through Wed) activities focus on Enterprise Definitions, initiative assessments, and preparing the Enterprise for change. Day 4 (Thursday) is dedicated to buying power initiative finalization and development of the group presentation. Group Presentations will then be conducted on Day 5 (Friday)
- The daily discussions and assignments are noted below.

Day 2: Enterprise Initiative Analysis & implementing Enterprise Change (60 min)

1. Identify an Enterprise buying power problem or deficiency.
2. Develop an Enterprise better buying power initiative statement.
 - a. What is the Enterprise Value Proposition of the initiative?
 - b. What are the probable effects on your own Value Proposition?
3. What are the major elements of your Enterprise Strategy for the initiative?
4. What cross-enterprise changes are needed to implement the strategy? How would you persuade members of your Enterprise to investigate, propose, and implement a cross-enterprise change that would positively enhance your buying power objective? (For example, what strategic actions to be taken both in and across the spheres of direct control and influence to gain buy-in for the initiative?)

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Syllabus Module W-1.0: **Enterprise Engineering, Technology, & Process II (lecture)**

Time: 1.5 Hours

Responsible: William Reinisch

Support: None

Presenter: William Reinisch

Materials: Slides

Readings: TBD

Assignment: None

Summary

This section will continue to provide more details on how the engineering, technology and processes can be used to manage technical organizations. We will further present and discuss technology and business approaches for the enterprise. We will continue to discuss the issues that businesses face in planning and managing technical organizations at an enterprise level.

Objective

- To further discuss the range, scope, and complexity of the issues and problems that an enterprise faces in the management of technology.
- To continue to relate strategic management of technology and engineering to the overall enterprise for the system engineer.
- To develop a further understanding of the management tools and processes that can be used to manage technology at an enterprise level.
- We will discuss some of the specific intra and inter enterprise techniques that are used as part of an enterprise technology strategy.
- To review some of the tools and concepts used by enterprises that are working specifically in service related technology intensive industries.
- Discuss the importance of the Strategy and people to ensure an optimal Enterprise.
- To continue to offer a practical framework for defining strategic management of technology at an enterprise level.

Support to Course Objectives

- Synthesize engineering and technology needs and investment strategies, objectives, and plans to support growth, adaptation, or change objectives.
- Effectively act as the stakeholder and owner of strategically aligned enterprise engineering.

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Syllabus Module W-2.0: **Technology Acquisition for the Enterprise (lecture)**

Time: 1.5 Hours

Responsible: William Reinisch

Support: None

Presenter: William Reinisch

Materials: Slides

Readings: TBD

Assignment: None

Summary

This section provides an introduction to how an enterprise thinks about, manages, and executes technology-based acquisitions. We will focus on the critical roles that the technical leaders play in this function. We will also discuss some of the issues that enterprises face in both acquiring and integrating highly technical organizations. We will also discuss the challenges of integration along with managing and communicating during these periods.

Objective

- Review why technical organizations might acquire other technical organizations.
- Understand technical acquisition strategies.
- To develop an awareness of the range, scope, and complexity of the issues and problems that an enterprise faces with technical based acquisitions.
- To review the role of technical due diligence in relation to the other enterprise processes.
- Relate strategic technical acquisitions to the system engineer and the overall enterprise organization.
- Discuss the challenges of post acquisition integration from the technical viewpoint.
- To offer some practical frameworks for determining the role of technology based acquisitions to the enterprise organization.

Support to Course Objectives

- Independently lead teams to develop enterprise technology acquisition strategies in support of organizational and business objectives.
- Synthesize engineering and technology needs and investment strategies, objectives, and plans to support growth, adaptation, or change objectives.

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Syllabus Module W-2.1: CA Technologies: Bringing the Cloud to Earth (Case Study)

Time: 0.5 Hours

Responsible: William Reinisch

Support: None

Presenter: William Reinisch

Materials: Case Document

Readings: “CA Technologies: Bring the Cloud to Earth”, HBR Case Study

Assignment: Read the Case Document

Summary

This section will review and reinforce the critical importance of understanding, managing and communicating a technology acquisition strategy through an interactive discussion of the CA Technologies: Bringing the Cloud to Earth case study.

Objective

- Students will be expected to pre-read the CA Technologies: Bringing the Cloud to Earth case study.
- Students will then be asked questions in the class to hone their ability and improve their understanding of the critical importance and skills that face technical leader when positing and communicating new technology strategy based on acquisitions.

Support to Course Objectives

- Independently lead teams to develop enterprise technology acquisition strategies in support of organizational and business objectives.
- Effectively communicate technology assessments and recommended responses to senior operational executives.
- Effectively communicate enterprise engineering and technology strategies to the broad set of enterprise stakeholders, customers, and prospective enterprise partners.
- Effectively act as the stakeholder and owner of strategically aligned enterprise engineering.
- Synthesize engineering and technology needs and investment strategies, objectives, and plans to support growth, adaptation, or change objectives.

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Syllabus Module W-3.0: **Enterprise Leverage of Engineering & Technology (lecture)**

Time: 1.0 Hours

Responsible: William Reinisch

Support: None

Presenter: William Reinisch

Materials: Slides

Readings: TBD

Assignment: None

Summary

This section provides an introduction to how the system engineer can help to leverage the technology and engineering functions as part of the overall business needs of the enterprise. We will focus on the most significant and valuable points of leverage for the overall organization. We will also discuss how to align the engineering and technology needs, processes, and tools to the most important needs of the enterprise.

Objective

- To develop a basic understanding of how the technology and engineering functions can provide overall leverage to an enterprise.
- To develop an awareness of the range, scope and complexity of the issues that the technology and engineering functions can cause to the enterprise and its organizations.
- To review the role of the technology functions for the value creation for the overall organization.
- Relate specific examples of the significance and importance of technical and engineering functions within the high technology sector.
- To offer some practical frameworks for determining the appropriate role of the leverage of technology to the overall enterprise organization.

Support to Course Objectives

- Effectively communicate enterprise engineering and technology strategies to the broad set of enterprise stakeholders, customers, and prospective enterprise partners.

Synthesize engineering and technology needs and investment strategies, objectives, and plans to support growth, adaptation, or change objectives.

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Syllabus Segment W-4.0: **Tools for Leading Enterprise Change (online simulation)**

Time: 2.5 hours

Responsible: Pamela Burke, PhD

Support:

Presenter: Pamela Burke, PhD

Materials: slides, PDFs, HBR Change Simulation: *Harvard Business Publishing Change Management Simulation: Power and Influence Online Simulation 3295 Rev. June 23, 2011*

Reading: None

Assignment: Prepare by viewing the user interface video, read the background of the company, and become familiar with the purpose and operation of the simulation

Summary

In this segment, students perform an online simulation to test and extrapolate principles for leading strategic organization-wide change. Students, acting as either the director of product innovations in a specialty glass company or the company CEO must gain acceptance and commitment to a company-wide change initiative on sustainability. Working alone or in pairs, students make choices to navigate the mobilization, movement, and sustaining phases of organization change while getting as many employees as possible through the change stages of awareness, interest, trial, and adoption. They have 18 change "levers" to use in order to gain credibility, communicate effectively, train associates, initiate structural/technical support for changes, make use of political tactics, and create cultural support for the changes.

Group Activities:

1. Online-change simulation and debrief (Note: once purchased, students can re-run the simulation in other roles and conditions on their own for up to six months.)

Objectives

- Practice strategic change leadership skills: diagnosis, action planning, implementation
- Increase skill in using social-network/ relationship skills in leading change, especially in conditions of low power or authority
- See the results of choosing change strategies and their timing
- Learn the potential effects of common missteps when leading organization change

Support to Course Objectives

- Professional Development leader: Develop enterprise engineering & technology human capital professional development strategies
- Enterprise Leverage: Identify needs and how to leverage people, technology, process, and tools across the enterprise
- Enterprise Communication: Effectively communicate enterprise engineering & technology strategies to the broad set of stakeholders, customers, & partners
- The Enterprise: Understand the nuances of enterprise operations & strategies for growth, adaptation, or change

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Syllabus Module W-5.0: Group Project

Time: 1.0 hours

Responsible: Gavito

Support: Hutchison, Burke

Presenter: Gavito

Materials: Handouts

Readings: N/A

Assignment: Daily assignments will be distributed via handouts.

Summary

- This module will provide an overview of 350C Group Project.

Objectives

- Prepare the students for leveraging the 350C learning to support develop and present a recommended Enterprise Buying Power Initiative.
- The operational concept for the project consists of daily group activities facilitated by a set of questions and assignments to stimulate Enterprise level leadership learning. Days 1 through 3 (Monday through Wed) activities focus on Enterprise Definitions, initiative assessments, and preparing the Enterprise for change. Day 4 (Thursday) is dedicated to buying power initiative finalization and development of the group presentation. Group Presentations will then be conducted on Day 5 (Friday)
- The daily discussions and assignments are noted below.

Day 3: Enterprise Change Strategy Group Discussions (60 min)

1. What are the enterprise drivers for the cross-entity change? (E.g. Strategy, Finance, Industry Changes, New Collaboration Opportunities...)
2. Using your Enterprise System representation, identify the enterprise entities that are currently affected by the Enterprise buying power problem.
3. How do organizational cultures currently affect the buying power problem?
4. What entities contribute to and/or are affected by the solution or solution-generating process?
5. How does the proposed solution (or proposed process for obtaining a solution) work with or against attributes of the current culture(s)?
6. How might the next steps in your plan build new culture attributes that will serve the organization going forward?
7. What key challenges do you see in creating this change?
8. Identify potential key change agents (including yourselves) and recommended leadership actions they will need to take to investigate, propose, and implement this cross-entity change to affect the buying power initiative.
9. What barriers, if any, are there to achieving effective coordination across organizational boundaries to capture these opportunities? How can these barriers be overcome or minimized?

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Syllabus Module H-1.0: **The Senior Technical Leader: Leading at the Enterprise Level**
(lecture)

Time: 1.5 hours

Responsible: Ralph Giffin

Support:

Presenter: Ralph Giffin

Materials: (slides, videos, case studies, hard-copy materials)

Readings: Seehan, Neil. *A Fiery Peace in a Cold War: Bernard Schriever and the Ultimate Weapon*, Random House (2009), ISBN-10: 0679422846

Assignment: (Pending)

Summary

Leading versus managing – team versus business versus enterprise

Understanding power, how to recognize it, and how to leverage for effective leadership

- Student Activity: Identify the sources of power in an enterprise

What is different for the technical leader?

Leadership style, behavior and philosophy

Effectively leading through the nuances of the enterprise

Pitfalls and guarantees for failure

Objectives

- Understand the Difference Between Management and Leadership
- Understand these differences at each organizational level
- Understand what is Different for the Technical Leader
- Understand Power and the Influencing of Behavior
- Understand Effective Leader Activities and Behaviors
- Understand the Enterprise as an Effective Leader
- Understand how to Effectively Fail as a Leader

Support to Course Objectives

This module will attempt to give the student a prospective on leading versus managing at each level of an organization with a particular focus on the enterprise level. In addition, the student will gain insight as to what is different for the technical leader versus other, non-technical leaders within the enterprise. Many of these challenges will be explored. Finally, this module will attempt to “demystify” leadership for the technical leader by introducing him/her to effective leadership practices that are independent of organizational domain.

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Syllabus Module H-2.0: **The Senior Technical Leader: Effectively Communicating at 360°** (lecture)

Time: 1.5 hours

Responsible: Ralph Giffin

Support:

Presenter: Ralph Giffin

Materials: (Slides, Audio/Video)

Readings: Angier, Natalie. *The Canon: A Whirligig Tour of the Beautiful Basics of Science*, Houghton Mifflin Company (2007), ISBN-10: 06794228460-618-24295-3

Assignment:

Summary

Importance of Communicating Effectively

Effective Communication Challenges: Enterprise

Communicating Technical Information to Non-Technical Constituents

The Impact of Non-Verbal Communication

The Art and Power of Story Telling

Objective

- Understand the consequences for not communicating clearly and in a timely manner
- Understand challenges of effectively communicating, particularly within the enterprise
- Gain an appreciation for importance of effectively packaging technical communication for consumption by non-technical constituents
- Appreciate the Importance and Gain an Understanding of Non-Verbal Communication
- Understand How Effective Story Telling can Enhance the Leaders Ability to Convey Important Information

Support to Course Objectives

The ability to effectively communicate up, down, and across the enterprise, as well as externally to a broad set of stakeholders, is of paramount importance for the success of any leader. The technical leader has additional challenges related to the sometimes highly technical information they must convey to non-technical individuals and groups. This module will attempt to give the student a prospective on the importance of, and how to become, an effective leader communicator across a wide variety of constituents and across the extended enterprise. A particular focus will be on, 1) the need for, and ways to, effectively convey technical information to non-technical decision makers and stakeholders; 2) the importance of understanding how and why we communicate non-verbally, and; 3) how story telling can become a powerful way for the leader to communicate to listeners and leave them with a more vivid and lasting engagement.

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Syllabus Module H-3.0: **Leading Enterprise Professional Development (Interactive Lecture, Group Activities)**

Time: 1 hour

Responsible: Pamela Burke, PhD

Support:

Presenter: Pamela Burke, PhD

Materials: slides, PDFs,

Readings: TBD

Assignment: None

Summary

In this segment, students compare exceptional personal professional development experiences and outline how they would construct a professional development strategy for their organization given the changing needs in their work.

Group Activities:

1. Small groups: appreciative inquiry discussion of the best professional development experiences they have had in their careers
2. Small groups: outline the key components of a professional development strategy that could align the organization's people with the current needs for change in the culture, behavior, and skill set.

Objectives

- Understand what leaders can do to build learning organizations where engineering and technology expertise is a key strategic asset

Support to Course Objectives

- Professional Development leader: Develop enterprise engineering & technology human capital professional development strategies
- Enterprise Leverage: Identify needs and how to leverage people, technology, process, and tools across the enterprise
- The Enterprise: Understand the nuances of enterprise operations & strategies for growth, adaptation, or change

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Syllabus Module H-4.0: **You as an Enterprise Change Agent (Interactive Lecture, Group Activities)**

Time: 1.0 hours

Responsible: Pamela Burke, PhD

Support:

Presenter: Pamela Burke, PhD

Materials: slides, PDFs,

Readings: None

Assignment: None

Summary

In this segment, students learn and apply Kurt Lewin's force field analysis model to an opportunity for change that they believe is important in their organization. Following the analysis, students identify two to four actions they can take to help create this change once the course is done.

Activities:

1. Groups of 2-4 people who see a similar opportunity to lead change in their organization perform a force field analysis and share it with the class
2. Personal reflection integrating the content from the past four days as they start an action plan for leading change

Objectives

- Opportunity to integrate your thinking about being a force for change in your organization today
- Identify an opportunity where you can apply what you've learned after class

Support to Course Objectives

- Professional Development leader: Develop enterprise engineering & technology human capital professional development strategies
- Enterprise Leverage: Identify needs and how to leverage people, technology, process, and tools across the enterprise
- The Enterprise: Understand the nuances of enterprise operations & strategies for growth, adaptation, or change

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Syllabus Module H-5.0: **Group Project****Time:** 1.0 hours**Responsible:** Gavito**Support:** Hutchison, Burke**Presenter:** Gavito**Materials:** Handouts**Readings:** N/A**Assignment:** Daily assignments will be distributed via handouts.**Summary**

- This module will provide an overview of 350C Group Project.

Objectives

- Prepare the students for leveraging the 350C learning to support develop and present a recommended Enterprise Buying Power Initiative.
- The operational concept for the project consists of daily group activities facilitated by a set of questions and assignments to stimulate Enterprise level leadership learning. Days 1 through 3 (Monday through Wed) activities focus on Enterprise Definitions, initiative assessments, and preparing the Enterprise for change. Day 4 (Thursday) is dedicated to buying power initiative finalization and development of the group presentation. Group Presentations will then be conducted on Day 5 (Friday)
- The daily discussions and assignments are noted below.

Day 4: Enterprise Change Presentation Development (90 min)

Select a target audience (e.g. cohorts, government executive, industry executive, faculty, etc.) for an overview of your Enterprise Buying Power Initiative. Develop a 20-minute presentation on your Enterprise Buying Power Initiative that addresses the salient group discussions during the week and what messages you want to convey. A list of presentation ideas for your consideration is noted below. It is desired that all members of the group participate in the presentation. Your group can choose any format such as slides, interactive discussions, skits, class activities, etc. Your creativity is welcomed.

- Your Enterprise System Diagram (nodes, connections, visible & virtual boundaries)
- Your Enterprise Direct and Indirect Spheres of Control & Influence
- Your Enterprise Cultural Attributes
- Your Enterprise Buying Power Initiative
 - The Enterprise Problem
 - The Initiative Statement, Goals and Objectives
 - The Initiative's Value Propositions and Potential Effects on other Value Propositions
 - Enterprise Organizational Structural Influence
 - The Implementation Strategy
- Enterprise Change Considerations

- Affected Enterprise Entities
- Enterprise Cultures
- Key Challenges and/or Barriers for Cultural Change
- Recommended Next Steps
- Sharing your insights - may include insights about
 - Your understanding of the enterprise - current & future
 - Your understanding of your own skills in leading change
 - Your thoughts about how you personally contribute to the culture and your role in enhancing it
 - Anything else you learned from doing this project
 - What you hope the class learns from your project

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Syllabus Module F-1.0: **Student Presentations (Group Project)**

Time: 1.0 hours

Responsible: Gavito

Support: Hutchison, Burke

Presenter: Gavito

Materials: Handouts

Readings: N/A

Assignment: Daily assignments will be distributed via handouts.

Summary

- This module will provide an overview of 350C Group Project.

Objectives

- Prepare the students for leveraging the 350C learning to support develop and present a recommended Enterprise Buying Power Initiative.
- The operational concept for the project consists of daily group activities facilitated by a set of questions and assignments to stimulate Enterprise level leadership learning. Days 1 through 3 (Monday through Wed) activities focus on Enterprise Definitions, initiative assessments, and preparing the Enterprise for change. Day 4 (Thursday) is dedicated to buying power initiative finalization and development of the group presentation. Group Presentations will then be conducted on Day 5 (Friday)
- The daily discussions and assignments are noted below.

Day 5: Group Presentation

The module will conclude with 20-minute Group Enterprise Buying Power Initiative presentation to the instructors and students.

Support to Course Objectives

- This module will afford the students to a) conduct senior technical leadership assessments of buying power deficiencies or issues in need of an Enterprise level assessment, b) develop new or modified buying power initiatives, c) discuss and recommend potential Enterprise adaptation or change required to effect the initiative, and, d) conduct an executive communication of their assessment and implementation plan to a simulated broad set of stakeholders. The students will leverage the portfolio of 350C lecture, case study, and exercise learning material presented during the week.

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Syllabus Module F-2.0: **Feedback (Administrative Segment)**

Time: 1.5 hours

Responsible: Hutchison

Support: Gavito

Presenter: Hutchison

Materials: Course Evaluation form; Instructor Project Assessment form

Readings: N/A

Assignment: N/A

Summary

The students will be asked to provide feedback on the course, including on the general content, the applicability of content to acquisition, and their (perceived) ability to apply the methods, techniques, and principles learned in their current organizational roles.

Students will be asked to perform individual assessments as well as complete a group exercise to identify the key feedback from the group.

In addition, the instructors will provide feedback on the group projects to the students.

Objectives

- Provide students' with feedback on their performance (as a group)
- Collect student impressions of the course (benefits, areas for improvement).

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APPENDIX G: RT-4 PILOT ASSESSMENT RUBRIC

Note: The rubric has been reformatted for this report; the actual rubric contains more space for free-form responses.

Course Assessment and Evaluation

Course Number and Title: SYS 350-X Technical Leadership

Course Location:

Dates:

Instructors:

Your Name (optional): _____

A. Instructor Evaluation:					
(1 IS STRONGLY DISAGREE; 5 IS STRONGLY AGREE)	1 Strongly Disagree	2	3	4	5 Strongly Agree
A-1. Explain the objectives of the course clearly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A-2. Are prepared for the class	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A-3. Present material in an organized manner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A-4. Has command of their subject	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A-5. N/A					
A-6. Successfully communicate the subject	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A-7. Are fair and consistent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A-8. OVERALL – The Instructors were an Effective Teachers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Course Evaluation:					
(1 IS STRONGLY DISAGREE; 5 IS STRONGLY AGREE)	1	2	3	4	5
B-1. The course is well structured	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B-2. The course material (notes and books) are well organized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B-3. The material was adequately covered in the allotted time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B-4. The course was structured to facilitate discussion and participant contribution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B-5. The subject matter has significant relevance and usefulness to my organization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B-6. I can apply what I have learned in this course on projects (underway or future) in my organization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B-7. The course will enable me to enhance my future career objectives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B-8. OVERALL – This was an Excellent Course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Questions:

The thing that I liked best about this course was:

If I could change one thing about this course, I would...

General Comments: